TROPICAL DISEASES BULLETIN

ISSUED UNDER THE DIRECTION OF THE HONORARY MANAGING COMMITTEE OF THE TROPICAL DISEASES BUREAU.



General Editor:
THE DIRECTOR OF THE BUREAU.

VOL. 3.

JANUARY 15, 1914—JUNE 15, 1914.

London:
TROPICAL DISEASES BUREAU,
Imperial Institute, S.W.

Sold by BAILLIÈRE, TINDALL & COX,
8, Henrietta Street, Covent Garden, W.C.

1914.

616.905
BAG



Acc. No. - 833
dt 26/12/06

HONORARY MANAGING COMMITTEE.

Chairman:

The Right Honourable Sir J. West Ridgeway, G.C.B., G.C.M.G., K.C.S.I., LL.D.
(who is also Chairman of the Advisory Committee of the Tropical Diseases Research Fund).

Sir John Rose Bradford, K.C.M.G., F.R.S.
(representing the Royal Society).

Surgeon-General Sir David Bruce, C.B., F.R.S.

Surgeon-General Sir R. Havelock Charles, I.M.S., G.C.V.O.

Colonel Sir William B. Leishman, R.A.M.C., F.R.S., K.H.P.

Sir John M'Fadyean, M.R.C.V.S.

Sir Patrick Manson, G.C.M.G., F.R.S.

Sir Ronald Ross, K.C.B., F.R.S.

Sir S. Stockman, M.R.C.V.S.

Mr. J. A. C. Tilley
(representing the Foreign Office and Sudan Government).

Mr. H. J. Read, C.B., C.M.G.
(representing the Colonial Office),
with
Mr. A. Berriedale Keith, D.C.L., D.Litt.
of the Colonial Office, as Secretary.

STAFF OF THE BUREAU.

Director:

A. G. Bagshawe, M.B., B.C., D.P.H. Cantab.,
of the Uganda Medical Staff.

Assistant Director:

G. C. Low, M.A., M.D., *Lecturer, London School of Tropical Medicine.*

Librarian:

R. L. Sheppard.

Sectional Editors:

Andrew Balfour, C.M.G., M.D., D.P.H. Cantab.

Fleet-Surgeon P. W. Bassett-Smith, R.N., C.B., M.R.C.P.

Aldo Castellani, M.D.

Major S. Lyle Cummins, R.A.M.C., M.B., B.Ch.

Captain S. R. Douglas, I.M.S. (retd.).

H. B. Fantham, B.A., D.Sc.

Edward Hindle, Ph.D.

Colonel W. G. King, C.I.E., I.M.S. (retd.).

R. T. Leiper, D.Sc., M.B., Ch.B.

J. B. Nias, M.D., M.R.C.P.

F. M. Sandwith, M.D., F.R.C.P.

J. Henderson Smith, M.B., Ch.B.

C. M. Wenyon, M.B., B.S., B.Sc.

Warrington Yorke, M.D.

Editor of the Tropical Veterinary Bulletin:

A. Leslie Sheather, B.Sc., M.R.C.V.S.

CONTENTS.

SECTIONS.

	PAGES.
Amoebiasis (Amoebic Dysentery, Liver Abscess, Spleen Abscess)	63–81, 447–68
Applied Hygiene in the Tropics	333
Beriberi	319–24
Blackwater Fever	161–3, 261, 443–4
Book Reviews	59–62, 117–8, 176–8, 234, 321–2, 392–6, 445–6, 507–10, 567–70
Cholera	105–16, 469–90
Dengue and Unclassed Fevers	328–30
Disease Prevention	353–82
Dysentery (Bacillary, Ciliate, Flagellate, and Unclassed)	81–9, 226, 458–68
Errata	396, 570
Filariasis	96–104, 315–8
Helminthiasis	285–99
Insect Transmitters of Disease	262–5
Kala Azar	130–43, 543–62
Leprosy	187–200, 491–506
Linguatulida Infections	276–7
Malaria	47–59, 144–60, 256–60, 353, 431–42
Miscellaneous	225–33, 280–4, 325–7
Myiasis	273–5
Pellagra	300–14
Plague	201–9
Protozoology	119–29, 511–26
Rat-Bite Fever	278–9
Relapsing Fever	1–20, 397–406
Reports, Annual	333–52
Sanitary Legislation	383
Sanitary Works	387–91
Skin Diseases, Tropical	235–40
Sleeping Sickness	21–46, 164–76, 243–55, 407–30, 527–42
Snake Bite	266–72
Sprue	94–5
Treatment of Waste	384–6
Typhus Fever	563–6
Undulant Fever	210–19
White Race, The, and the Tropics	220–5
Yaws	241–2
Yellow Fever	179–86

Index of Authors	571–579
Index of Subjects	581–622
Quarterly Lists of References	Appendix, pp. vii–xxxviii, xxxix–lxxxii.

ILLUSTRATIONS IN THE TEXT.

Apparatus for Cultivation of Malarial Plasmodia *in vitro* 439
Branched form of *S. rubrum* 406
Chinese Flea-Trap 380
Cultures of Malarial Plasmodia 440
Infiltration Galleries 390
Map showing distribution of Kala Azar in China 131
Pipettes for obtaining Stained Preparations of Cultural forms of Flagellates in Kala Azar 137
Plans of Freetown, Sierra Leone, shewing Anopheles Breeding-places.. 368–369
Protozoa-like Bodies in Blood, and in Spleen of Patient with Protracted Fever and Splenomegaly (Castellani) 522
Rat-guard for Ship's Lines 371

MAPS.

Outline Map of Western Province, Uganda Protectorate (to illustrate abstract of Dr. H. L. Duke's paper) .. *facing* 33
Sketch Map showing Nyasaland Protectorate and adjoining Territories .. .. *on* 22

PLATES.

Crithidia hyalommae, ... *facing* 123
Typical Examples of *Amoeba* and *Entamoeba* .. .. „ 64
Typical Sites for Collections of Pupae of Glossina .. „ 43

TABLES.

Table giving the Salient Characters of the More Important Mammalian Trypanosomes .. .. .. *facing* 428

ERRATA.

p. 69. LESK's paper, lines 12 and 13, the expression "gave a vague history of having had dysentery some months before" is incorrect; the German original is to the effect that the boy had already suffered for some months from dysentery, and the sentence should be amended by the insertion of the word "for" before "some months."

p. 295. DE ALMEIDA'S paper, lines 12 and 14, for "tabloid" and "tabloids" read "tablet" and "tablets," or some other equivalent of the Portuguese word "comprimidos," the word "tabloid" being the registered trade mark of Messrs. Burroughs Wellcome & Co.

p. 432. STEPHENS' paper, last line, for "*Plasmodium pertenue*" read "*Plasmodium tenue*."

Accno. 833
Cl. 26/12/06

TROPICAL DISEASES BUREAU.

ZOOLOGICAL GARDEN
Kolkata
700027
ALIPORE

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 1.

RELAPSING FEVER.

North Africa.

Conseil (E.). **La Fièvre Récurrente Nord-Africaine. (Etude Clinique sur Cent Soixante Cas.)**—*Arch. Inst. Pasteur Tunis.* 1913. No. 1/2. pp. 37-66.

During the epidemics of 1912 and 1913 in Tunis, the author had the opportunity of observing numerous cases of relapsing fever and has collected notes on the clinical features of the disease. The incubation period varies from two to eight days, being usually about five to six. The disease begins suddenly without any prodromal symptoms. The initial symptoms are merely those of all acute febrile diseases and closely resemble those of influenza. After the first attack, which generally lasts from five to nine days, there is an apyretic period of five to fifteen days (average—seven to nine days) followed by a relapse, which may present all gradations from a mere slight elevation in temperature up to an attack lasting some days and equalling the initial one in the severity of the symptoms. Almost invariably after one, two, or three typical relapses, one notes slight rises in temperature of one to two days' duration unaccompanied by any other symptoms, and similar abortive relapses may be observed in patients that have been treated with salvarsan, etc. The number of typical febrile attacks is somewhat variable, but of 108 untreated cases seventeen had only one attack; 79, two attacks; nine, three attacks; whilst three patients had four attacks. The disease thus differs from tick-fever, in which there are usually several relapses, and resembles more closely European relapsing fever.

Briefly, the average course of the disease is two attacks of five to six days each, separated by an apyretic period of about ten days. Often during the apyretic period a subfebrile condition may be noticed, the patient showing little accesses of fever resembling those of malaria.

The most characteristic symptoms, in addition to the fever and the presence of spirochaetes in the blood, are the hypertrophy of the liver and spleen, combined with the fact that

(33067—2.) Wt. P. 2348—33. 2000. 1/14. D & S.

these organs are painful on pressure. The very high temperature and rapid pulse are generally combined with a good general state, without delirium or prostration, and with the preservation of all the intellectual faculties. Occasionally however, though rarely, the patient is prostrated by the infection and presents nervous symptoms resembling those of typhoid.

Jaundice is present in a considerable number of the cases (53 out of 160), but is never accompanied by retention of bile.

When the liver is seriously affected a so-called bilious type of the disease may be produced and this form is the most dangerous. Death was observed in six out of 160 cases, and five of these fatal cases succumbed to the bilious type.

E. Hindle.

Nicolle (Ch.), Blaizot (L.), & Conseil (E.). **L'Epidémie Tunisienne de 1912 et la Demonstration expérimentale de la Transmission de la Fièvre Récurrente par les Poux.**—*Arch. Inst. Pasteur Tunis.* 1913. No. 1/2. pp. 1-30.

The first part of the paper is concerned with a description of the epidemic of relapsing fever that broke out in Tunis during the year 1912. From the evidence produced it seems most probable that the disease was introduced from Tripoli, by natives of that country who came to work in the mines. The outbreak of relapsing fever corresponded with a considerable epidemic of typhus, which is easily explicable as both are transmitted by lice.

Although it is not stated, the remainder of the article is merely a reprint of that previously published by the authors in the *Annales de l'Institut Pasteur* (see this *Bulletin*, Vol. 2, p. 143).

E. H.

Sergent (Edm.). **Infection de Fièvre Récurrente par les Muqueuses chez l'Homme.**—*Compt. Rend. Soc. Biol.* 1913. Aug. 1. Vol. 75. No. 28. p. 185.

Although in 1909 Nattan-Larrier showed that the spirochaete of relapsing fever could pass through sound mucous membranes, in view of the theory of Nicolle, Blaizot and Conseil regarding the louse transmission of this disease, the following observation is of some interest.

Three persons were assisting at the injection of a monkey with blood containing spirochaetes (Algerian strain). As the result of a movement of the monkey the blood squirted out of the syringe and fell on the forehead and eyes of all three persons. Two of these wore neither eye-glasses nor spectacles and some of the blood fell into their eyes; eight days later both developed an attack of relapsing fever which was cured by injections of salvarsan. The third person wore spectacles which prevented the infected blood entering his eyes, and he remained in good health. It seems, therefore, that the first two persons had been inoculated through the mucous membranes of the eyes, whilst the latter had been protected by his spectacles.

E. H.

Conseil (E.). **Chimiothérapie de la Fièvre Récurrente.**—*Arch. Inst. Pasteur Tunis.* 1913. No. 1/2. pp. 67-87.

The author has employed a variety of compounds in the treatment of the relapsing fever of North Africa and gives a detailed account of his results. Eleven cases were treated with intravenous injections of salvarsan (dose = 0·008 gm. per kilo body weight), and ten of these were cured as a result of one injection. In one case, however, the patient relapsed, but the severity of the symptoms seemed to be diminished. In every instance the injection of the drug was followed by a very violent reaction, the patient being completely prostrated for a period of from 5 to 20 hours, after which the symptoms disappeared and the patient rapidly recovered.

Eleven cases were treated with intravenous injections of neosalvarsan (dose = 0·021 to 0·007 gm. per kilo.). No accident occurred and all the patients were cured as a result of one injection. The administration of the drug was followed by a general reaction one or two hours later, but this reaction was less severe than that following the injection of salvarsan.

Hectine (sodium para-amino-phenyl-arsenate) was employed in seven cases, being administered intramuscularly in doses of 0·2 to 0·4 gm. repeated daily for 6 to 20 days. The results were uncertain for, although relapses were prevented in four cases, in the remaining three the disease followed its normal course.

Galyl and Ludyl (two arsenical compounds prepared by Mouneyrat) were found to have a prompt curative action in eight cases. Both compounds are strongly recommended by the author, as they can be employed more easily than neosalvarsan and seem to be equally efficacious.

In addition, injections of potassium antimonyl tartrate and aniline antimonyl tartrate were employed. The first compound was used for eight patients, doses of 0·1 gm. being injected daily, and in four cases relapses were prevented. The other compound was used for five patients, and in only one case was it successful in curing the disease and preventing relapses. These antimony preparations, therefore, are of little use in the treatment of relapsing fever, the most effective compounds being neosalvarsan, galyl, and ludyl.

E. H.

Tropical Africa.

Rodhain (J.), Pons (C.), Vandenbranden (F.), & Bequaert (J.). **Rapport sur les Travaux de la Mission Scientifique du Katanga (Octobre 1910 à Septembre 1912).** (Chap. 1. pp. 7-27. Observations concernant la Fièvre Récurrente Africaine.)—1913. Brussels: Hayez, Imprimeur de l'Académie Royale. [Royaume de Belgique—Ministère des Colonies.]

The authors give a short account of the distribution of *Ornithodorus moubata* accompanied by a map, on which are marked new localities in the Katanga district at which ticks were found by members of this expedition.

Then follows a description of thirteen cases of "Tick Fever" (*S. duttoni*) occurring in natives. In all cases the cerebro-spinal

fluid was examined but, although alterations in the composition of the fluid were noticed, spirochaetes could never be detected, either by microscopical examination, or by injecting monkeys with the liquid.

The authors' conclusions are as follows:—

(1) In more than 50 per cent. of the cases the development of *Spirochaeta duttoni* in the negro is accompanied by an alteration of the cerebro-spinal fluid, consisting in a mononucleosis with augmentation in the total amount of albumins.

(2) This meningeal reaction, of varying intensity, may or may not be accompanied by symptoms of persistent cephalalgia and contraction of the pupil lasting for some time after the febrile periods and in the absence of visible spirochaetes in the blood.

(3) Neither microscopical examinations, nor the inoculation of the altered fluid into susceptible monkeys have enabled us to decide whether the meningeal reaction is caused by the penetration of spirochaetes into the cerebro-spinal fluid. One may admit that the multiplication of these micro-organisms is very ephemeral or perhaps localized in this region; in any case their active multiplication seems to constitute a great exception.

(4) In the single case in which several successive lumbar punctures could be practised, the cytological and chemical alterations of the cerebro-spinal fluid, which existed eighteen days after the first appearance of spirochaetes in the blood, had disappeared fifty-seven days after the commencement of the infection, at the same time as the patient developed symptoms of a severe ocular lesion.

Finally the authors add notes on the treatment of "Tick Fever" by intravenous injections of salvarsan. Most of their results were published in the *Annales de l'Institut Pasteur* (Vol. 25, p. 539), and these observations are reproduced together with two fresh cases, making a total of eleven. The curative dose was found to be 0·01 gm. per kilogram of the body weight of the patient, injected intravenously. In doses of 0·005 to 0·008 gm. per kilo. of the body weight the spirochaetes disappeared from the blood, but relapses were not prevented.

E. H.

BLANCHARD (M.). **Epidémie de Spirochétose humaine à Bikié (Congo français).**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 559-560.

In April and May, 1913, Dr. MORACHINI observed numerous cases of fever among both Europeans and natives at the station of Bikié, French Congo. Preparations of the blood of these patients were sent to Blanchard, who found spirochaetes in them and thus confirmed Dr. MORACHINI's suspicion that the disease was "Tick fever."

[This is the first record of African Relapsing Fever occurring in French Congo.]

E. H.

DRAKE-BROCKMAN (R. E.). **On the Occurrence of an Epidemic of Relapsing Fever in Bulhar, British Somaliland.**—*Jl. London School Trop. Med.* 1913. Nov. Vol. 2. Pt. 3. pp. 195-199. With 2 charts.

The author gives some particulars of an outbreak of relapsing fever at Bulhar, a coast town of British Somaliland. The disease

was restricted to two haffas,* one occupied by a race of outcasts (Midgans) and the other by a somewhat destitute tribe of Somalis. In the former haffa there were 46 huts with 106 inhabitants and of these, in April, no fewer than 38 had had the fever and 17 were then down with it. In the adjoining haffa, out of 152 inhabitants 6 had recovered while 8 were still infected. The following ticks were found in and about the huts of the infected:—*Hyalomma aegyptium*, *Rhipicephalus pulchellus*, *R. simus*, *R. sanguineus*, *Boophilus* sp., *Ornithodorus savignyi* and *Argas persicus*. *O. savignyi* was found almost entirely in the soft soil or sand covering the floor of the huts or immediately outside them. The Somalis have a special name for this tick (Kudkudeh), which is common in all the coast towns, and say that the bite sets up great irritation. *Argas persicus*, on the other hand, is said not to attack man in this region.

With regard to the disease, charts are given of the temperature in two cases. The spirochaetes in every case were only found during the initial attack and not in any of the relapses. The parasite appears to be identical with *S. duttoni* and the author is of the opinion that the disease has been recently imported from British East Africa. During the past few years a colony of Somali traders has been established in Nairobi and therefore the natives are continually arriving from that region. The natives say that the disease has only recently appeared in this region though they have known the ticks from their childhood. The symptoms seem to be of the usual African type, the disease relapsing after successive intervals of one, two and three weeks.

There was apparently no difference between the symptoms of the initial attack and the relapses. The main symptoms were severe headache with giddiness, vomiting and profuse sweating. Constipation was marked in both cases. In one case there was photophobia, conjunctivitis and iritis after the first attack, whilst in two others there was bronchitis.

E. H.

Lamoureux (A.). **La Fièvre Récurrente de Madagascar. Considérations Cliniques. Le Spirochète dans l'Organisme Humain. Essai de Traitement par le '606.'**—*Bull. Soc. Path. Exot.* 1913. July. Vol. 6. No. 7. pp. 523-533. With 7 curves.

The author gives further details of twenty-five cases of relapsing fever observed at the military hospital of Majunga on the West Coast of Madagascar (see this *Bulletin*, Vol. 1, p. 625). The infection is transmitted by *Ornithodorus moubata* and the clinical symptoms of the disease closely resemble those of African relapsing fever (*S. duttoni*). According to the patients the incubation period varies from 6 to 15 days. The first attack generally lasts about three or four days and is accompanied by a temperature of 38° to 40° C. The symptoms are very inconstant, but headache, prostration and gastro-intestinal disturbances with constipation are usually present. In three-quarters of the

* A "haffa" is a collection of huts forming an irregular town block, all occupied by members of the same tribe.

cases the first attack was followed by one or more relapses occurring at intervals varying from three to nine days: in exceptional cases the intervals were respectively two and eleven, twelve and fifteen days. The symptoms were generally less intense during the relapses than in the first attack.

The spirochaetes were generally very rare in the blood and could seldom be found after the first attack. Occasionally, however, as many as five and six parasites were present in each microscopic field. The spirochaetes belong to two types, the first of which are long (20-40 μ) and fine, with numerous spirals, whilst the second are short (8-15 μ) and thick, with few spirals, and are often irregular and twisted. The latter forms are the more numerous.

The fever seems to be very benign and there were no fatal cases; but all the patients were adults and the author was unable to determine whether or not they possessed any immunity against the disease as a result of possible previous infections. The recurrent character of the fever is not constant, for occasionally cases of spirochaetal infection were observed with only a single attack.

Fowler's solution, arrhenal, sodium cacodylate and quinine were found to be without action on the disease. Salvarsan administered intravenously in single doses of 0·3 gm. was very inconstant in its action. It did not prevent relapses and moreover when administered during the first attack did not always cause the disappearance of the spirochaetes.

E. H.

Chalmers (Albert J.) & O'Farrell (W. R.). **Bronchial Spirochaetosis.**—*Jl. Trop. Med. & Hyg.* 1913. Nov. 1. Vol. 16. No. 21. pp. 329-334. With 3 figs.

The authors describe cases of bronchial spirochaetosis observed in the Anglo-Egyptian Sudan, the first time that it has been recorded from this locality. The disease seems to be fairly common in Khartoum, for ten cases were met with in a period of only two months. In all the patients large numbers of spirochaetes were found in the sputum, and relatively but few bacteria and no other organisms such as fungi. The parasite seems identical with that observed by Castellani in the sputum of similar cases in Ceylon, and named by him *Spirochaudinnia bronchialis*.

The authors then proceed to shew that the spirochaete must be the cause of the bronchitis. The parasite is morphologically distinct from that occurring in the mouth and throat (*S. dentium*, etc.) of a large proportion of normal persons; therefore the disease is not caused by an increase in the number of these mouth or throat spirochaetes and their invasion of the bronchi. These forms occasionally invade the bronchi but can be readily distinguished from *S. bronchialis*. Moreover, an experiment is described in which a monkey, that had a small number of fine spirochaetes at the top of its larynx [probably a variety of *S. dentium*], was caused to develop a bronchopneumonia by exposing it to a severe chill. The monkey died and on post-mortem numerous pneumococci and a few of the laryngeal spirochaetes were found; the latter were identical with those found

before infection. *S. bronchialis* was found to be always present in abundance during attacks of bronchial spirochaetosis, to diminish during convalescence, and subsequently to disappear or become extremely rare. A monkey that was injected intratracheally with sputum from a case of bronchial spirochaetosis and subsequently chilled, developed a temperature of 106·3° the same night, had a peculiar kind of cough and showed a quantity of mucus hanging down from its muzzle. The mucus of the throat was found to be full of *S. bronchialis*. In a couple of days the monkey became very much better and the spirochaetes disappeared.

In addition two members of the laboratory became infected under conditions that seem to exclude any other source of infection than contact with the cases in the laboratory. Both shewed the presence of *S. bronchialis* in the sputum and one was treated with arsenic, when the symptoms promptly disappeared.

The authors then discuss the symptomatology of the disease and its complications, including the pneumococcus, the tubercle bacillus, and a fusiform bacillus. The diagnosis of the infection can only be made by examining the sputum and finding the spirochaete. The disease is very mild and is readily amenable to treatment. It seems to be spread by the agency of human carriers, and secondary causes such as chills are of great importance.

E. H.

India.

Steen (R.) & Townsend (R. S.). **Relapsing Fever in Bulandshahr District. U.P., 1912-1913.**—*Indian Med. Gaz.* 1913. Sept. Vol. 48. No. 9. pp. 338-341. With 6 temperature charts.

Relapsing fever has been present in epidemic form during the past eighteen months in several districts in the North-West of the United Provinces, being most prevalent in Muzaffarnagar, Meerut and Bulandshahr. According to notes left by previous Civil Surgeons in the latter district, there occurred in 1908 three cases of relapsing fever in the Jail and two in the Police Hospital; in 1909, five cases in Jail and two in Police Hospital; in 1910 nil; in 1911 three in Police Hospital; in 1912 nil. As routine blood examination was practised in these hospitals it is difficult to believe that the disease was at all widespread in this district during these years. During April, May and June, 1912, three severe outbreaks of fever with high mortality were reported, and subsequently further outbreaks in September, October and November. The examination of the blood of patients revealed the presence of spirochaetes morphologically indistinguishable from *S. recurrentis*. The disease has been proved to exist in 65 villages, so is evidently very widespread.

The predisposing causes are said to be undoubtedly dirt, poverty and insanitary surroundings, for nearly all the cases occurred amongst the lower castes of the people. The body-louse was often found on infected persons while bed bugs were frequently absent, and the authors describe cases, showing the very infectious nature of the disease, which are easily explicable now that its mode of transmission by the body-louse is known.

From various observations the incubation period seems to be from four to eight days. The onset is usually sudden, the temperature runs up to 103°-104° and there are all the usual symptoms accompanying high fever during the next day or two. Prostration is usually extreme from the onset, and delirium, sometimes very violent. Headache is sometimes severe, but pains in other parts of the body are more frequent.

The first attack may last from five to ten days, the average being about eight. The fall occurs nearly always by crisis, frequently accompanied by great collapse; death often occurs at this period.

The interval between the first and second attacks varies from five to fourteen days, the average being eight to ten days, and its duration is generally about five or six days. Occasionally yet another attack develops but as a general rule there is only one relapse. Out of 140 cases twenty (14 per cent.) had no relapse, 113 (81 per cent.) had one relapse, and seven (5 per cent.) had two relapses.

The clinical symptoms do not call for any special remark, but it may be noted that parotitis was present in 7 per cent. of the cases and was a very serious complication. Pneumonia was also another serious complication and when present generally developed towards the end of the first attack.

The mortality in the epidemic varied greatly in different places and also in different outbreaks. In the earlier cases it was often as high as 75 to 80 per cent. but subsequently became considerably lower. Careful collection of information from all parts of the district gave a total of 744 cases with 197 deaths (= 26·5 per cent.). In another series of figures (140 cases) the mortality was 54·3 per cent., but the authors state that 30 per cent. seems to be the usual mortality.

The authors did not employ salvarsan or any other drugs in the treatment of the disease, but from the results obtained in other regions there is little doubt that these compounds would be effective in the treatment of this variety of relapsing fever.

[The high mortality during epidemics of relapsing fever in both India and China is worthy of notice, for many observers have recorded outbreaks with mortalities as high as 60 to 70 per cent. Nevertheless the spirochaete causing the disease in these districts seems to be morphologically identical with that of the European and North African relapsing fevers (*S. recurrentis*) in which the mortality rarely, if ever, exceeds 5 per cent.]

E. H.

Smith (C. H.) & Graham (G. F.). **Relapsing Fever in Chitral with an Account of Successful Animal Inoculations.**—*Indian Med. Gaz.* 1913. Oct. Vol. 48. No. 10. pp. 381-382. With 4 charts.

The authors describe eleven cases of Indian relapsing fever, occurring in Chitral in the late winter and spring of 1913, which seem to illustrate two types of the fever. The outbreak first appeared among some remote Kaffir villages on the Afghan

frontier situated at about seven thousand feet elevation. According to the villagers this seemed to be a disease which was previously unknown among them. The cases are divided into two groups. (1) Two cases occurring in Punjabis and commencing about ten days after they returned from these Kaffir villages. In both patients there was a continuous fever lasting for several days and in one case there was a relapse. Blood examination showed the presence of numerous spirochaetes of rather a small type. (2) Nine cases occurring among Gurkhas and Pathan sappers of the Chitral garrison, three of which showed no relapse; four, one relapse; and individual cases two and three respectively. The incubation period seemed to be about ten or eleven days. Compared with the first two cases the general condition of the patients was much less grave, but the relapses prolonged the duration of the infection. The spirochaetes, which were present in the blood of all nine patients, are said to be larger than those present in the first two cases and were comparatively rare in the peripheral circulation. The type of fever present in these latter nine cases is said to resemble that of Quetta relapsing fever described by Browse (see this *Bulletin*, Vol. 1, p. 386).

Three rats received a subcutaneous injection of 1 cc. of blood taken from the vein of one of the second group of cases during a relapse. Each of the rats became infected after an incubation period of three to four days; spirochaetes were present in the blood for two or three days, after which they disappeared and were not found again. A subinoculation from one of these into another rat gave positive results, the animal becoming infected after an incubation period of three days.

The paper is accompanied by four charts, illustrating the two cases of type 1 and two of type 2.

[The distinction between the authors' two types seems to be very uncertain, for the type of fever is liable to considerable variation in different individuals and also races. It is unfortunate that measurements are not given of any of the spirochaetes, for differences in length between the two types would easily be recognised by measuring a sufficiently large number of individuals (say fifty) and taking the average. The ease with which the authors have succeeded in making subinoculations into rats and the length of time the parasites persisted in the infected animals seems to differentiate this spirochaete from *S. recurrentis*.]

E. H.

Humphry (A. D.). **Relapsing Fever in the Darjeeling District.** [Correspondence.]—*Indian Med. Gaz.* 1913. Nov. Vol. 48. No. 11. p. 451.

The author records an outbreak of relapsing fever at Margaret's Hope Tea Estate at an elevation of 5,000 feet at the end of May, 1913. The outbreak was traced to the wife of a tea-maker who arrived ill direct from Nepaul.

The total number of cases was 25, of which 15 recovered and 10 died; four cases relapsed once and two cases twice. The main symptoms were fever beginning in the evening, pain in the back

and limbs, followed by vomiting, diarrhœa and slight jaundice. The duration of the fever was about six to eight days and its remission was accompanied by profuse sweating.

These cases occurred in 5 houses that were close together, but each surrounded by a clear air-space. In all the patients spirochaetes could be easily found by examining stained preparations, in one slide there being as many as 10 parasites to the field.

E. H.

Indo-China and China.

Mouzels (P.). **La Fièvre Récurrente au Tonkin et plus particulièrement à Hanoï pendant les Epidémies de 1911 et 1912.**— *Ann. d'Hyg. et Méd. Colon.* 1913. Apr.-May-June. Vol. 16. No. 2. pp. 249-282.

The first case of relapsing fever recognised in Tonkin was observed by Séguin in 1907. Since this time numerous other reports have appeared and the prevalence and high mortality of the Chinese relapsing fever is shown in the following table of the cases occurring in Tonkin:—

Year.	Number of Cases.	Number of Deaths.	Mortality.
1908	2,300	625	27·17 per cent.
1909	1,581	627	39·65 „
1910	315	95	30·15 „
1911	840	350	41·66 „

The author was able to observe the greater number of the cases treated in the native hospital of Hanoï during the years 1907 to 1910, and since 1911 has made a detailed study of another 117 cases. The present account is especially concerned with the latter and comprises a description of the clinical symptoms of relapsing fever, its treatment and, finally, its epidemiology and prophylactic measures.

The symptoms do not call for any special remark, as they have been previously described. A single attack was noticed in 20·83 per cent.; two in 59·72 per cent.; three in 16·68 per cent.; and four attacks in 2·77 per cent. of the cases.

The spirochaete is morphologically indistinguishable from *S. recurrentis*. It is generally present in the blood during the first attack, disappears during the apyretic intervals and reappears when the temperature rises again. The plasma of the blood seems to be modified, for the author noticed that the coagulability of the blood is considerably retarded and in certain patients there is a great tendency to haemorrhages, especially of the nose and intestine.

With regard to the etiology of the disease the author discusses the possibility of various modes of infection and concludes that ectoparasites must be responsible for the transmission. Lice,

bugs, fleas and mosquitoes are all found capable of carrying the virus, but lice, fleas and mosquitoes are considered the most important.

An epidemic occurred in the house of a well-to-do native, where the only insects present were fleas and mosquitoes. Lice and bugs were quite absent and yet five persons out of the seven occupants of the house became infected. Living spirochaetes were found in the stomach of a *Culex* two hours after its capture in the hospital; moreover the spirochaete remained virulent for five days in the stomach of the bug and six days in the louse; therefore all these insects may serve as carriers. The author is of the opinion that the disease may be transmitted by any blood-sucking insect. In this connection the seasonal prevalence of the infection is most interesting, as practically all the cases occur in the first six months of the year. This is well shown in the following table of the cases in the hospital at Hanoï:—

Month.	1907.	1908.	1909.	1910.	1911.	Total each month.
January	0	1	0	6	1	8
February	1	3	2	5	4	15
March	4	10	5	13	28	60
April	12	15	10	16	38	91
May	16	27	9	9	24	85
June	5	15	6	7	18	51
July	1	3	2	1	3	10
August	2	1	0	2	0	5
September	0	2	2	0	0	4
October	0	1	0	0	1	2
November	0	0	0	0	0	0
December	0	1	1	0	0	2

In Tonkin the hottest season of the year is about April; on the approach of the cold weather of August the disease rapidly disappears. [This seasonal variation agrees with the view that Culex is the main carrier of the infection, but is opposed to the view that lice are responsible, for in this case the disease should be especially prevalent during the colder months of the year.]

As prophylactic measures the author advocates the isolation of patients, the destruction of all blood-sucking insects and the protection of healthy persons against any risk of infection.

With regard to treatment the use of intravenous injections of salvarsan is found to cure the disease rapidly, and in addition the period of convalescence is very much shortened. Its use in hospital is therefore an economy, as the patients are able to leave after an average duration in hospital of only 12 days, instead of 30 days which was the usual period prior to the introduction of salvarsan.

E. H.

TAYLOR (H. B.). **Relapsing Fever. The Relation of Rise and Defervescence of Temperature to the Appearance and Disappearance of Spirochaetae in the Peripheral Blood; with Notes on Treatment by Salvarsan.**—*China Med. Jl.* 1913. Sept. Vol. 27. No. 5. pp. 318-320.

The author remarks that further and closer observations are necessary to determine the usual time of the appearance of *Spirochaeta recurrentis* in the peripheral blood after the onset of fever, in both the original attack and the relapse. From his observations the author is of the opinion that in many cases the spirochaetes cannot be detected until the second or third day after the onset of fever.

Particulars are given of seven cases of relapsing fever that were treated by injections of salvarsan. Of two patients that had only received 0·2 gm. salvarsan, one showed a relapse of three days on the seventeenth day of the disease and the other two slight relapses at long intervals. When 0·3-0·4 gm. was given intravenously, no relapses were noticed.

E. H.

LOGAN (O. T.). **Relapsing Fever. The Relation of Rise and Defervescence of Temperature to the Appearance and Disappearance of Spirochaetae in the Peripheral Blood.**—*China Med. Jl.* 1913. Sept. Vol. 27. No. 5. pp. 321-324.

The author gives particulars of the number of spirochaetes present in the blood of relapsing fever patients, in order to call attention to the fact that the spirochaetes do not appear in the peripheral blood until some hours after the onset of fever and moreover disappear some hours before the temperature falls to the normal again.

E. H.

RUSSIA.

WINOCOUROFF (J.). **Rückfallfieber bei Kindern in Odessa. (Eigene Beobachtungen vom Jahre 1890-1910.)** [Relapsing Fever amongst Children in Odessa. (Observations during the years 1890-1910.)]—*Arch. f. Kinderheilkunde.* 1913. May 24. Vol. 60/61. pp. 777-789. With 8 curves.

During the twenty years from 1890-1910 the author has observed numerous cases of relapsing fever amongst children at the Jewish Hospital of Odessa. The disease seems to be much less fatal to children than adults, for out of 291 cases observed by the author there was only one death, whilst the general death rate of this disease is about 2 to 6 per cent. The main reasons that children do not succumb to the affection seem to be the healthy state of their heart muscles and the absence of alcoholic livers. Moreover, complications which are stated to occur frequently amongst adults are very rarely observed in children. Referring to the disease amongst babies the author remarks that it is extremely difficult to arrive at any definite conclusions with regard to its severity or otherwise, for as a general rule the attacks are probably not brought to the notice of physicians, the disease passing unnoticed by the parents.

The Indian Ink method of examining the blood is stated to be the simplest method of detecting the spirochaetes in the peripheral circulation.

In conclusion the author remarks that by improving the hygienic conditions of the poorer classes the disease would disappear from Odessa, in the same way that it has ceased to exist in Western Europe.

E. H.

Soper (William B.). **A Case of Spirillum Infection.** — *Arch. Internal Med.* 1913. Sept. 15. Vol. 12. No. 3. pp. 273-275.

The author describes the history of a patient admitted to the Presbyterian Hospital, New York, apparently suffering from cholecystitis and pericarditis with effusion. Subsequently on four separate occasions fluid was aspirated from the chest and pericardium, and on two occasions was found to contain a few spirilla which were cultured anaerobically in Noguchi's medium for spirochaetes. Morphologically this spirillum is said to be made up of a number of segments lying end to end. These segments average 0·3 to 0·5 μ in width and 1 μ in length and the ends are rather abruptly blunt. The author remarks that this case, which ended fatally, seemed to be one of infection originating below the diaphragm and extending upwards. Nevertheless repeated cultures of the aspirated fluid were uniformly negative and the complete absence of any organisms, except the spirilla, make the supposition of a pure spirillum infection quite reasonable. The original pus and cultures were inoculated without effect into both rabbits and guinea-pigs.

[Unfortunately the author was unable to take a blood culture from the patient or to make an autopsy, and therefore the case is a little doubtful.]

E. H.

The Life-History of Spirochaetes.

Marchoux (E.) & Couvy (L.). **Argas et Spirochètes. Deuxième Partie. Le Virus chez l'Acarien.**—*Ann. Inst. Pasteur.* 1913. Aug. 25. Vol. 27. No. 8. pp. 620-643.

In the present memoir the authors continue their investigations on the biology of *S. gallinarum* (see this *Bulletin*, Vol. 2, pp. 365, 366) and demonstrate the presence of infective spirochaetes in the body of infected Argas. A Java sparrow inoculated with the triturated organs of two Argas became infected after an incubation period of eight days and succumbed to the disease, but another bird inoculated with the organs of three ticks never showed any signs of illness, but nevertheless was immunized against the disease. In another experiment the inoculations into sparrows of one salivary gland and one oviduct of a tick respectively, conferred immunity. This immunity was shown not to be the result of the presence of immune bodies in the organs of the tick, by inoculating birds with the filtered

extracts of the bodies of Argas, and also with the organs of ticks that had been heated to 55° C. in order to kill any living spirochaetes. In both cases no immunity was developed in the birds as proved by subsequent inoculations of virulent spirochaetes, and therefore the immunity must have been the result of the vaccination.

The authors then injected definite numbers of spirochaetes into Java sparrows and found that when injected subcutaneously 20,000 parasites infected a bird, 1,700 vaccinated it against subsequent infections without the infection developing, whilst 700 were without effect. Administered intravenously, 1,700 infected, 70 vaccinated, whilst 17 were without effect. In another experiment the developing embryos of fowls, whilst still in the egg, were injected with spirochaetes: 30 parasites were sufficient to produce a fatal infection in the embryo. These results were employed in order to estimate approximately the number of spirochaetes present in infected ticks.

With regard to the spirochaetes in the glands of the tick, the salivary and cephalic glands were carefully examined. Coxal glands were never discovered and the authors are of the opinion that the so-called coxal fluid excreted by Argas after a meal is merely the result of the rapid filtration of coelomic fluid through a thin sheet of chitin. [Robinson and Davidson have recently shewn that a coxal gland is present in Argas, but the gland is very inconspicuous and might easily be overlooked (see *Parasitology*, 1913, Vol. 6, pp. 250-252).]

In the salivary glands themselves spirochaetes were found very exceptionally, and then in very small numbers, but by isolating the salivary duct, crushing it on a slide, and staining with gentian violet considerable numbers of spirochaetes could be seen. After a meal spirochaetes appear in the acini of the salivary ducts but subsequently they disappear from this position, remaining only in the salivary duct where a single duct may contain as many as 900 parasites. The number of spirochaetes seems to be augmented after each meal, whether of infected or normal blood, and therefore the more often the ticks are fed, the more liable they become to transmit the infection.

The salivary fluid is thus infected and the authors observed infections produced in birds by the bites of Argas that certainly did not emit any coxal fluid or excrement whilst on the host.

The cephalic glands were constantly infected with spirochaetes, and as the secretion of these glands bathes the eggs when laid it is possible that this plays an important part in the transmission of the disease to the offspring. It was found by immersing freshly laid ova in blood containing spirochaetes that these parasites are capable of penetrating the chitinous layer surrounding the eggs; therefore it is quite conceivable that the eggs become infected by the entrance of spirochaetes contained in the secretion of the cephalic gland. On the examination of the eggs laid by infected Argas a very small proportion contained spirochaetes, but by making an emulsion of several eggs and centrifuging, two or three masses of agglutinated and extremely fine spirochaetes were obtained. The

injection of 20 eggs into a Java sparrow produced no infection but immunised the bird, and therefore these eggs probably contained more than 700 spirochaetes. In another experiment the contents of two eggs injected into the embryo of a fowl produced a fatal infection. Finally fourteen fowl embryos were injected each with the contents of single ova laid by infected Argas. Six of them, viz. 40 per cent., became infected; therefore each of these ova probably contained at least 30 spirochaetes. Nevertheless in most cases it was impossible to detect the parasites microscopically, and therefore one is compelled to assume that the thickness of the spirochaetes diminishes until they become so fine as to be ultra-microscopic, but that these forms are still virulent and capable of producing the infection when injected into susceptible animals.

E. H.

BALFOUR (Andrew). **A Contribution to the Life-History of Spirochaetes. A Reply to Dr. Gleitsmann.**—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Aug. 4. Vol. 70. No. 3/4. pp. 182-185.

The author replies to GLEITSMANN'S criticism of his work on the spirochaetosis of Sudanese fowls and more especially the hypothesis with regard to the nature of the so-called granules (see this *Bulletin*, Vol. I., pp. 622, 623). With regard to the cross-immunisation experiments the author points out that these are very uncertain, as NICOLLE and BLAIZOT have shown that in the case of the *recurrentis* group of spirochaetes a great deal depends on the age of the animal and still more on the dose of the virus. It is not considered necessary, as GLEITSMANN states, that in order to prove the granule theory one must assume either that the author was dealing with a special spirochaete strain, or a similar cycle must be demonstrated for all spirochaete strains. The question of racial peculiarity in the host organism, and the influence of local conditions should not be forgotten in this connection.

The "granule phase" is very common in Sudanese fowls, and in young chicks is even the rule, but it is not essential for the propagation of the virus. The granules shed by the spirochaetes are coloured faintly by Romanowsky stains, an observation which supports the idea of their spore nature.

The author describes an interesting experiment on the nature of the granules. A healthy chick was isolated and on November 15th was given 90 washed tick's eggs from several batches of *A. persicus*. These eggs contained numerous granules (=coccoid bodies), but none were found to contain spirochaetes. On November 23rd a few cell inclusions were found in the blood of the chicken and their numbers gradually increased until November 30th when the bird showed definite signs of illness. From December 1st to 6th the number of bodies decreased but on December 7th spirochaetes appeared in the blood; they disappeared the following day and were never found again. The chicken however remained in a somewhat marasmic condition and died on February 17th;

the intra-corpuscular bodies were present in its blood up to the time of its death.

Referring to the difficulties of work in the tropics the author mentions that he has recently found a spirochaete in the Malpighian tubule of a *Hyalomma aegyptium* which had fed only on the blood of healthy cattle. Finally it is pointed out that no toxin could produce the schizonts occurring in the Sudanese fowls infected with spirochaetosis. If these forms are not related to the spirochaete the only other explanation is that of a new blood parasite and a new disease closely associated with spirochaetosis probably because *A. persicus* is the carrier of both viruses.

[In order to avoid confusion it should be clearly understood that the term granule has been applied to at least three structures; (1) The spore-like bodies often liberated by spirochaetes; (2) The intra-corpuscular bodies first described by Balfour and supposed by him to develop from the above-mentioned spore-like bodies; and finally, (3) the coccoid bodies, or Leishman's granules, occurring in the cells of the tick or invertebrate host of the spirochaete. It would be simpler to restrict the term granule to (1), and apply the terms "intracorpuscular bodies" and "coccoid bodies" to (2) and (3) respectively. With regard to the nature of the intracorpuscular bodies, as Balfour agrees, the last word has not been spoken, but their appearance is such that they can hardly be the result of degeneration, as Gleitsmann supposes.]

E. H.

Gleitsmann. **Beitrag zur Entwicklungsgeschichte der Spirochäten (Borrelien). Ein Schlusswort zu Balfours Erwiderung.**—[The Life-History of Spirochaetes (Borrelia). A Concluding Note to Balfour's reply.]—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Aug. 4. Vol. 70. No. 3/4. pp. 186-187.

In this note the author repeats certain of his former statements and replies to some of Balfour's criticisms. With regard to the experiment described by Balfour (*see* above) Gleitsmann is of the opinion that the chicken was already infected with spirochaetosis when isolated and that the appearance of spirochaetes in its blood was merely the result of a relapse. The appearance of the spirochaetes for only one day tends to confirm this view.

E. H.

Laboratory.

Launoy (L.). **Le Fer du Sang chez la Poule normale et dans l'Infection par le *Spirochaeta gallinarum* Marchoux et Salimbeni.**—*Compt. Rend. Soc. Biol.* 1913. Oct. 24. Vol. 75. No. 29. pp. 248-249.

The author has estimated the amount of iron in the blood of nine normal fowls and finds that it only varies within very narrow limits, 0·042 to 0·047 gm. per 100 cc. of blood. He then estimated the amount of iron in the blood of four fowls five days

after they had been infected with fowl spirochaetosis. In every case the quantity of iron was on an average 25 per cent. less than in normal blood.

[Stephens and Christophers were the first to name *Spirochaeta gallinarum*: therefore Launoy is mistaken in attributing the name to Marchoux and Salimbeni, who although they discovered the fowl spirochaete, never named it.]

E. H.

Launoy (L.) & Lévy-Bruhl (M.). **Sur l'Anémie observée chez la Poule au Cours de l'Infection par le *Spirochaeta gallinarum*.**—*Compt. Rend. Soc. Biol.* 1913. Oct. 24. Vol. 75. No. 29. pp. 250-252.

The authors have studied the anaemia which is so well-marked in fowls that have been infected with fowl spirochaetosis. In their experiments they used a relatively attenuated virus, for the spirochaetes appeared in the blood of the fowl about 48 hours after inoculation and disappeared on the fifth or sixth day. The number of red cells was estimated by means of Malassez's haemocytometer and the following results obtained.

Fowl.	Before Infection.	After 2 days.	After 3 days.	After 5 days.	After 6 days.
1	2,740,000	2,135,000	1,950,000	1,800,000	—
2	2,881,200	2,435,000	2,250,000	1,340,000	—
3	2,520,000	„	„	1,445,000	1,460,000
4	2,920,000	„	2,140,000	1,800,000	1,820,000
5	2,890,000	2,540,000	2,280,000	1,470,000	1,260,000

It is seen that the maximum anaemia is reached about the fifth day and after this crisis the number of red cells gradually increases, reaching the normal again in about twelve or thirteen days. On comparison with the diminution in the amount of iron in the blood, it is evident that the reduction in the number of corpuscles is proportionately greater, for in the former case it is only about 25 per cent. If one accepts the hypothesis that all the iron in the blood is fixed in the red cells, it is necessary to conclude that the individual value of the latter is augmented during the anaemia accompanying an attack of spirochaetosis. This observation shows that spirochaetal anaemia is closely related to the pernicious anaemias, the main difference being the quick recovery in the case of the former.

Morphological examination of the blood of infected fowls showed that polychromatophilia was present. Moreover the globular resistance of the cells was found to be slightly diminished (from 0·35 to 0·40).

E. H.

Launoy (L.) & Lévy-Bruhl (M.). **L'Infection Spirillaire chez les Poules Ethyroïdées. Pouvoir Vaccinant de leur Sérum.**—*Compt. Rend. Soc. Biol.* 1913. Nov. 14. Vol. 75. No. 31. pp. 352-354.

The authors have removed the thyroid glands of five fowls and then injected them with *S. gallinarum* in order to determine whether this gland has any effect upon the course of the disease. The results shew that in adult fowls the thyroids do not play any essential part in the resistance of these animals to the infection, or in the rapidity and intensity of the formation of antibodies.

E. H.

Hata (S.). **A Contribution to our Knowledge of the Cultivation of** *Spirochaeta recurrens* [*recurrentis*]. — *Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Nov. 26. Vol. 72. No. 1-2. pp. 107-112. With 1 fig.

In the endeavour to cultivate spirochaetes by Noguchi's method the difficulty of obtaining ascitic fluid, and moreover the variable nature of this liquid, have given rise to the necessity of finding some substitute which can be obtained at any time. The author finds that normal horse serum diluted with twice its volume of physiological saline and then heated forms a satisfactory substitute. Before being heated the mixture is poured off into test tubes and these are then placed in a water bath at 58° C. and the temperature gradually raised until it reaches 70° or 71° C. in three hours. The tubes are then heated at 71° C. for 30 minutes when the whole contents will present a translucent milky appearance with a semi-solid surface. After cooling, this mixture of semi-coagulated serum and saline can be substituted for Noguchi's ascitic fluid, with satisfactory results as far as the cultivation of *S. recurrentis* is concerned.

In addition, the author finds that the buff coagulum (the "buffy coat" composed of white corpuscles and platelets), which is produced during the clotting of the horse blood, can be substituted for the kidney of Noguchi's medium. One or two pieces of this coagulum about 1 cm. in diameter are put in each tube of semicoagulated serum and saline, and pushed down to the bottom by means of a sterile glass rod.

This culture medium is inoculated with a small quantity of blood containing the spirochaete and the cultures may be kept either at 37° C. or at room temperature. At 37° C. multiplication of the parasites is observed on the second day and reaches its maximum in 5-7 days and the spirochaetes may remain virulent for 21 days. The number is a little less than when kidney is used instead of coagulum, but on the other hand the spirochaetes are more virluent and show fewer degeneration forms. For subcultivation about 0·5 cc. of a 5-7 days' old culture is inoculated into a fresh tube and in this way the author has maintained *S. recurrentis* through 27 passages in 150 days and it still produces most vigorous cultures. Spirochaetes that have been cultivated at 37° C. for 4-5 days will live at room temperature for at least 60 days.

Finally, a further advantage of this medium, in addition to the uniform results obtained by its use, is the fact that prepared tubes can be kept for two weeks in a refrigerator without loss of efficacy.

[The results obtained by the author seem to be so very satisfactory that there is little doubt that the above-described medium will be a most useful substitute for Noguchi's medium, as the preparation of the latter involves numerous practical difficulties].

E. H.

HÜGEL (G.). **Experimentelle Beiträge zur chemotherapeutischen Wirkung von organischen Antimonpräparaten bei Spirochaeten- und Trypanosomenerkrankungen.** [Experimental Study of the chemotherapeutical Action of Organic Antimony Compounds on Spirochaetal and Trypanosome Infections.]—*Arch. f. Dermatol. u. Syphilis.* Orig. 1913. Sept. Vol. 118. No. 1. pp. 1-60.

The first part of this somewhat lengthy paper is devoted to a historical account of the subject extending back to the earliest times. The author then proceeds to give an account of his experiments with a large number of organic antimony compounds. In every case the effect was tried on fowls infected with *S. gallinarum*, and injections were made both at the same time as the fowl was inoculated with the spirochaetes and also after the parasites had appeared in its blood.

The results are somewhat disappointing, for only three compounds showed any indication of being of value as curative agents. These three compounds—the sodium salts of acetyl-p-aminophenylantimonate, benzolsulphono - p - aminophenylantimonate, and p-urethano-phenylantimonate, respectively—were also injected, with favourable results, into rabbits infected with syphilis, as the spirochaetes disappeared from the testes and most of the animals recovered.

The same three compounds were also used for the treatment of mice infected with dourine and nagana respectively. In most cases the length of life of the treated animal was increased and in one or two cases the animals were apparently cured, but there is no evidence of their having been kept under observation for a sufficintly long period to decide the latter point.

Finally, a few cases of human syphilis were treated by injections of the first and last of these compounds. The administration of the drugs was well borne in every case and after repeated injections the symptoms of the disease were found to disappear in the case of patients treated with the acetyl compound.

[From the author's results it seems doubtful whether organic antimony compounds are likely to be of much use in the treatment of spirochaetosis or trypanosomiasis. The paper contains an extraordinarily large number of printer's errors, the majority of the tables and many of the formulae being incorrect and somewhat misleading.]

E. H.

Hahn (Benno) & Kostenbader. **Beitrag zur Erklärung der Wirkungsweise des Quecksilbers bei den Spirillosen.** [A Study of the Mode of Action of Mercury Salts on Spirochaetal Infections.]—*Berlin. Klin. Wochenschr.* 1913. Nov. 24. Vol. 50. No. 47. pp. 2185-2186.

Employing an organic mercury compound (fluorescin-mercury), the authors have investigated its mode of action in spirochaetal infections, using as an example fowls infected with spirochaetosis. Their results show that in the case of fowl spirochaetosis, and also in human syphilis, extremely active mercury compounds have no direct action upon the spirochaetes either *in vitro*, or, in the case of *S. gallinarum*, within one hour after a curative dose of the drug has been injected into an infected fowl. Apparently, therefore, this compound has no parasitotropic action.

Employing another mercury salt, benzol-sulphonic acid azomercuric salicylate, the authors found that, when half the *dosis tolerata* was administered to infected fowls as soon as the spirochaetes appeared in the circulation, the parasites at once disappeared, whilst if greater doses were administered actually more spirochaetes appeared in the blood of these treated fowls than in the blood of untreated ones.

These results agree with Meyer's experience that in the treatment of syphilis the administration of massive doses of mercury salts is not as effective as that of smaller doses, whilst on the other hand the large doses have a very definite injurious action upon the body.

E. H.

Flourens. **Doses Limites auxquelles le Chlorhydrate d'Emétine et le Chlorhydrate de Quinine peuvent être employés chez le Calfat.** —*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 642-644.

The author has tried the effects of treating infections of *S. gallinarum* in the Java sparrow (*Padda orizivora*) by means of chlorhydrate of emetine and chlorhydrate of quinine respectively. Neither compound was found to be of any use in the treatment of either this infection or fowl pest, but in the case of the former the course of the disease was frequently prolonged. It was found that these birds can withstand doses of 0·015 gm. of the emetine compound and 0·125 gm. of the quinine salt, in both cases the dose being calculated for a kilogram of body weight.

E. H.

SLEEPING SICKNESS.

NYASALAND PROTECTORATE. **Sleeping Sickness Diary.** [HEARSEY (H.). Principal Medical Officer.] 1913. August 31. Part 21. 11 pp. Zomba: Government Printer.

During the four months previous to August 31st 25 cases of sleeping sickness were notified. These added to those previously reported make a total of 153. Details of these 25 cases are given. As was stated in the last issue of the Diary (see this *Bulletin*, Vol. 2, p. 346), a reinvestigation of the contiguous fly-infested districts, to the north and south of the Proclaimed area in the Dowa district, was shortly to be undertaken. Three months' investigation was allotted to each of the following four districts.

Marimba district.—Seven cases were found in a month by Dr. MORGAN; six of them were discovered in the northern portion of the fly area and one case in the extreme southern part of the district where the Marimba and Dowa fly areas merge.

Dedza district (between the Lintipe river and South Nyasa district).—The reinvestigation of this district was undertaken by Dr. DAVEY; after a most painstaking search for three months no cases were discovered. As in the past, failure was attributed to the unfavourable attitude of the natives and to an entire lack of co-operation on their part.

South Nyasa district.—Two cases were found by Dr. SANDERSON.

Upper Shire district.—This area is to be investigated by Dr. SANDERSON.

The object of these investigations is to demonstrate that the disease is to be found wherever there is tsetse fly. An effort is now being made to substitute facts for conjecture, with a view to inducing people living in or passing through fly areas to appreciate the danger and to adopt the necessary precautions. For, however small the risk of infection may be, the fact remains, the author writes, that the disease is invariably fatal within a short period.

Preventive measures.—These may be briefly summarised as follows:—

"1. Impressing upon the natives the necessity of avoiding being bitten by flies.

"2. Clearing for a distance of 300 yards or more round villages situated in close proximity to fly. Extending these clearings in many instances so as to embrace their food gardens also.

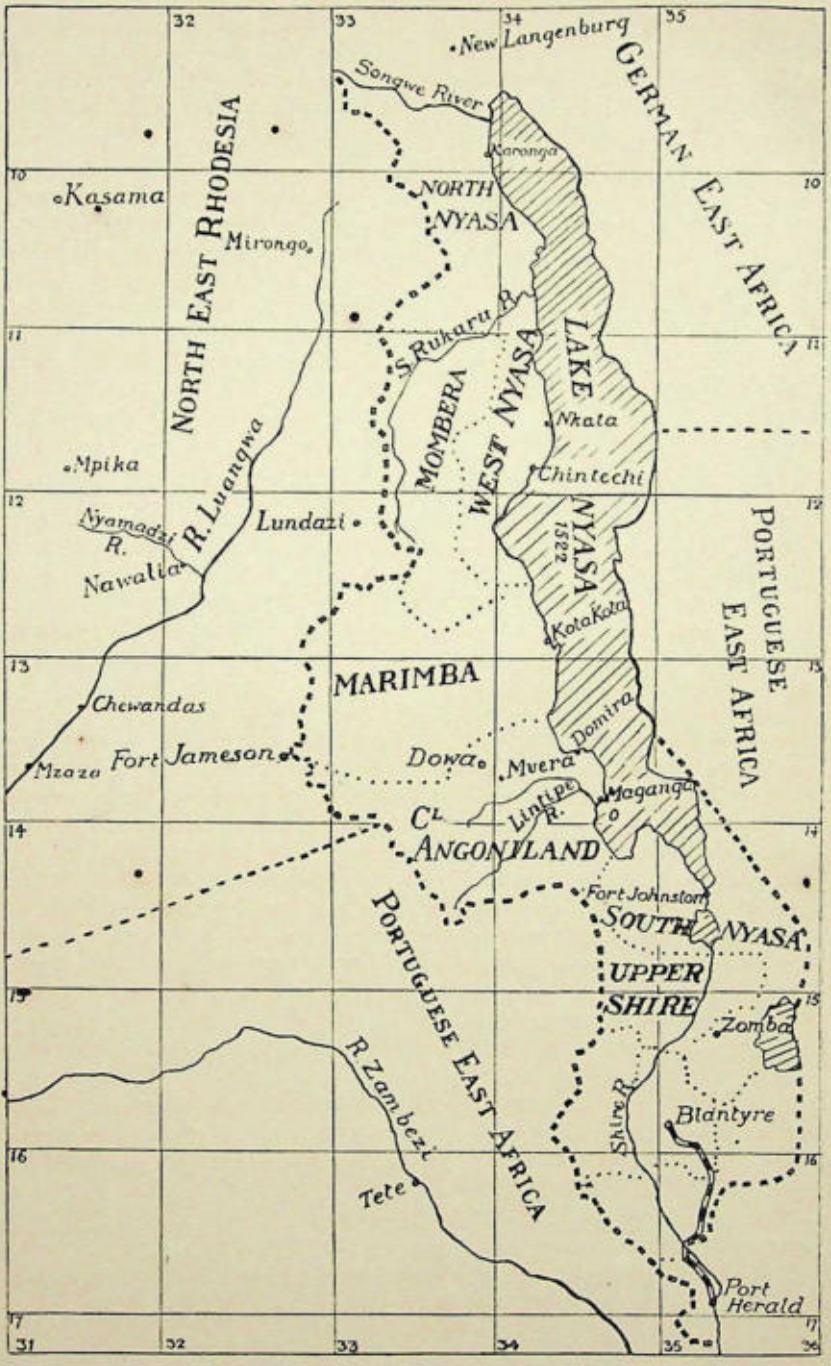
"3. Making clearings on each side of roads and main paths leading from one village to another, thus uniting groups of villages and enabling the natives to journey from one to another with commensurate safety.

"4. Instructing the natives to use this felled timber for firewood, and to avoid visiting the adjacent fly-infested woods for this purpose.

"5. Instituting public latrines in all the villages, to prevent natives from visiting the adjoining woods for the purpose of defaecation.

"6. Prohibition as to the firing of grass till the month of October, when only it is fit for burning, so as to ensure as large and as effectively cleared areas as possible.

"7. Removal, whenever feasible, of villages situated in danger zones to fly-free areas."



SKETCH Map, showing NYASALAND PROTECTORATE and adjoining territories.

Scale about 85 miles to 1 inch.

To expedite clearing operations, axes and heavy knives have been supplied to natives in the Sleeping Sickness Area. The supervision of the clearing operations has been placed in the hands of Medical officers' patrols and police employed in the area. All the work is being done by the villagers themselves without payment of any kind.

Treatment.—Various treatments have in the past been given a trial:—(1) Atoxyl alone, (2) Atoxyl with intermediate doses of perchloride of mercury, (3) Soamin, (4) Salvarsan, (5) Tartar emetic, (6) Dye, B.S. In no case was there recovery or even distinct improvement.

W. Yorke.

May (S. Aylmer). **Report on Sleeping Sickness in Northern Rhodesia. Feb. 1912 to Oct. 1913.**—Report to the British South Africa Company. Received in Colonial Office December 15, 1913.

This report is divided into two portions, the first dealing with the Luapula, Mweru and Tanganyika Sleeping Sickness (*G. palpalis*) areas, and the second with *G. morsitans* transmitted human trypanosomiasis.

A very satisfactory state of affairs exists as regards the Luapula, Mweru and Tanganyika areas; the whole country to the east of the Luapula and Lake Mweru has been depopulated and it may now be reasonably considered that practically all risks of extension of the disease is at an end. Only one case was discovered during the past year. There are in all 23 cases under treatment. The restrictions formerly in force have been modified and only those portions of the Luapula, Mweru and Tanganyika districts which have been depopulated are included as closed area; the boundary lines are given. The Tanganyika, Mweru and Luapula divisions have been reported on respectively by Dr. W. H. Storrs, the late Dr. Master and Dr. E. E. Storrs.

Since the date of the last Report* (Feb. 1912) 29 cases of the *G. morsitans* transmitted disease have been found. These bring the total number of cases recorded since August 1909 up to 95. Details are given of the localities in which these cases were found. The Mpika portion of the Luangwa closed area was re-examined by Dr. Kinghorn in May and June 1913. It is estimated that 91 per cent. of the total adult population was palpated. The death rate (from all causes) for the district is 37·8 per thousand. The total number palpated was 2613; details as to the state of the glands are given in a table. All those with + or + − glands were punctured and trypanosomes found in the gland juice of two. Kinghorn writes.—

"So far as it is possible to judge, therefore, the outlook is distinctly encouraging. The villages in this portion of the Sleeping Sickness area were visited at periods varying from 18-24 months previous to the present occasion, and whereas eight cases were then diagnosed only two have been isolated this year. Strong support is afforded, accordingly, to the view that the disease is of old standing in the Luangwa valley and that it has

* Summarised in *Sleeping Sickness Bulletin*, Vol. 4, p. 195–202.

now reached a state of comparative equilibrium. Were this not the case it might have been expected that the disease would have made more pronounced strides in two years, more particularly in view of the general lowering of vitality which must have occurred in the natives during the period of semi-starvation which existed last year. The general health of the community now appears to be satisfactory."

Fundu medical examination and detention camp.—This station was established in January 1912 with the following objects:—(1) Medical examination and detention of natives travelling to Southern Rhodesia from the Luangwa closed area and Nyasaland. (2) To establish a station for the southern part of the Luangwa closed area from which the population of the surrounding district could be periodically examined. (3) To provide medical assistance and treatment for natives of the surrounding districts.

Since the establishment of this station some 17,000 natives have passed through for work in Southern Rhodesia and 4 cases of trypanosomiasis have been found, 3 amongst the natives going south and the other from a neighbouring district. The disease has not been discovered in any native subsequent to his having passed through this camp.

The author writes that no satisfactory explanation can be offered to account for the failure of the disease to spread under the apparently eminently favourable conditions which exist in the greater part of the Luangwa valley. It may be suggested (1) that the disease is an old one and that the bulk of the population is immune; (2) the source of supply of infection, namely the extent to which the game is infected with *T. rhodesiense*, may not be so extensive as is at present thought; (3) the fact that the disease tends to be localised in certain areas and along the main roads would suggest that there is still a link wanting in the chain of evidence in favour of the 'Fly' and 'Game' trypanosomes being identical with that which causes human trypanosomiasis.

The next section of the report deals with the relationship of game to human trypanosomiasis. The advisability of undertaking an experiment to determine the relationship which exists between game and fly, and incidentally between game and human trypanosomiasis is discussed. The Lukasashi valley, north of the Mkushi-Petauke road was examined by Mr. Ll. Lloyd and found to be in every respect an eminently suitable place for such an experiment. Before attempting an experiment of this magnitude and nature careful consideration is required of (1) the cost, (2) the probable result, (3) the possibility of arriving at a correct conclusion as to the interpretation of the result. It was estimated that the experiment would cost £11,350. One or other of the following conditions will be found to result from this experiment. (*a*) The total disappearance of fly from the area cleared of game; (*b*) a diminution in the amount of fly present; (*c*) unchanged conditions as regards the presence of fly. [The author has omitted to mention the effect on the infectivity of the fly. This is certainly one of the most important pieces of information required.] May goes on to discuss the feasibility of correctly interpreting any results which might be obtained and concludes that it would not be possible. He writes:—

"A study, therefore, of all the circumstances bearing on the experimental destruction or removal of the game from a selected area, owing to the large expenditure involved, our present ignorance of the bionomics of this fly, and therefore our inability to correctly interpret the results following this experiment, does not lead to the opinion that this experiment would be justified by its results.

"Our knowledge of the facts bearing on the relationship of sleeping sickness to big game, and our knowledge of the present position of the disease do not justify the agitation which at present exists for the general destruction of game as a preventative of the spread of this disease.

"Until there is definite proof (1) that the disease is spreading, (2) that the game is responsible for the maintenance of the fly, (3) that the game is the only reservoir of the disease, or even the chief one, and (4) that the conditions following the destruction of the game will be an improvement on those which at present exist, it is a reasonable conclusion that the presence of this disease as it now exists does not afford sufficient excuse for killing out the game. . . . There is . . . increasing reason to think that the disease is an old one and has arrived at a condition of equilibrium. . . . Its present condition requires no hasty or drastic measures 'for extirpating the living reservoirs of sleeping sickness' the grounds for which are purely hypothetical and unreliable."

The following measures are recommended:—

1. Natives in fly areas should be prohibited from keeping domestic animals, goats, sheep, dogs, &c.
2. They should be encouraged by means of trapping, pits, drives, and if possible by being allowed a certain number of firearms, to clear the vicinity of all villages in fly country of game; except in the vicinity of villages game should be as far as possible unmolested in order to prevent their movement into areas free of infection.
3. That cultivated lands should be protected by clearings so that the grass can be completely burnt without endangering the crops.
4. Every effort should be made to get rid of fly by trapping, &c.
5. Certain routes only should be used by natives and others travelling through these areas and these routes should as far as possible be rendered safe both by the removal of infected cases and by the encouragement of game destruction in their vicinity.

A recommendation has been submitted for the relaxation of the present stringent rules and regulations governing the movements of natives in the Luangwa closed area.

The report closes with a general programme of entomological work which is to be undertaken.

[The recommendations of the author seem rather inconsistent with the general argument of the paper. He doubts the identity of the "Game" and "Fly" trypanosome with that infecting man but proposes to clear the game from the vicinity of villages and main roads, presumably in case he should be wrong. This procedure is none other than the "hasty or drastic measure the grounds for which are purely hypothetical and unreliable" proposed by the reviewer in the discussion at the Zoological Society and elsewhere, and referred to and severely criticised by May in the present paper.]

W. Y.

Schilling (Claus). **Beobachtungen über die Schlafkrankheit in Uganda.** [Observations on Sleeping Sickness in Uganda.]—*Deut. Med. Wochenschr.* 1913. Oct. 23. Vol. 39. No. 43. pp. 2094-2096. With 2 text-figs.

In this paper an account is given of the prophylactic measures adopted in Uganda (kingdom) against sleeping sickness. The

author points out that during the past 18 months no deaths from sleeping sickness have been notified by the chiefs. The native population is intelligent, understands the significance of the disease, and appreciates the measures adopted by the Government. Moreover, deaths are speedily notified on account of taxation.

The condition of affairs in Busoga, Toro and the Nile district is different. In these localities there is still much sleeping sickness. The people are given six months in which to move to fly-free areas; at the end of this time all the canoes are collected and burned, and the villages destroyed.

An account is given of the clearing operations which have been undertaken at Entebbe, Port Bell and Jinja.

W. Y.

MACFIE (J. W. Scott) & JOHNSTON (J. E. L.). **Auto-Erythrophagocytosis as an Aid to the Diagnosis of Trypanosomiasis.**—*Jl. London School Trop. Med.* 1913. Nov. Vol. 2. Pt. 3. pp. 212-215.

Reference is made to the work of CONNAL on this subject (see *Sleeping Sickness Bulletin*. Vol. iv. p. 189). The authors have examined a number of animals infected with trypanosomes (*T. lewisi*, *T. nigeriense* and *T. duttoni*) and have noticed this ingestion of red cells. The number of erythrocytes ingested by a single leucocyte varied from one to twelve or even more. The ratio of cells containing erythrocytes to other leucocytes is, as a rule, very low; it is seldom over 1 per cent., but in one mouse it was no less than 11·5 per cent.

The cases in which phagocytosis of red cells were found are divided into the following three groups:—

Group A. In which leucocytes containing red cells were present in blood which later showed trypanosomes.

Group B. In which both were present at the same time.

Group C. In which phagocytosed red cells were seen after the disappearance of the trypanosomes.

The phenomenon was also observed in one case of blackwater fever and in a guineapig inoculated with blood from a case of yellow fever.

The authors put forward the suggestion that erythrophagocytosis may be of material aid in the diagnosis of trypanosomiasis.

W. Y.

TRANSMISSION.

ECKARD (B.). **Uebertragung des *Trypanosoma rhodesiense* durch die *Glossina palpalis*.** [The Transmission of *T. rhodesiense* by *G. palpalis*.]—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Nov. 26. Vol. 72. No. 1/2. pp. 73-76.

Since KLEINE showed that trypanosomes underwent a developmental cycle in Glossina much work has been done on this subject.

The chief results obtained in transmission experiments are given in chronological order in the following table:—

TABLE.

Observers.	Species of Trypanosome.	Species of tsetse.	Locality.
Kleine	*T. brucei.*	*G. palpalis.*	G. E. Africa (L. Victoria).
Kleine	*T. gambiense.*	*G. palpalis.*	G. E. Africa (L. Victoria).
Bruce, Hamerton, Bateman & Mackie.	*T. gambiense* and T. of dimorphic type.	*G. palpalis.*	Uganda (L. Victoria).
Bruce, Hamerton, Bateman & Mackie.	*T. vivax.*	*G. palpalis.*	Uganda (L. Victoria).
Bouffard	*T. cazalboui* (= *vivax* ?).	*G. palpalis.*	Senegambia.
Bouet & Roubaud ...	*T. cazalboui.* *T. dimorphon.* *T. pecaudi.* (= *brucei* ?).	*G. palpalis.* *G. tachinoides.* *G. longipalis.*	Dahomey.
Fehlandt	*T. congolense.*	*G. morsitans.*	G. E. Africa (L. Tanganyika)
W. Fischer	*T. brucei.*	*G. palpalis.*	G. E. Africa (L. Tanganyika).
Kinghorn & Yorke ...	*T. rhodesiense.*	*G. morsitans.*	N. Rhodesia.
Duke	*T. nanum.*	*G. palpalis.*	Uganda (L. Victoria).
Kleine & Fischer ...	*T. gambiense.*	*G. morsitans.*	G. E. Africa (L. Victoria).
Fraser & Duke ...	*T. uniforme.*	*G. palpalis.*	Uganda (L. Victoria).
Bouet & Roubaud ...	*T. dimorphon.*	*G. morsitans.*	Senegambia.
Rodhain, Vandenbranden, Pons & Bequaert.	*T. cazalboui.*	*G. morsitans.*	Congo.
Kinghorn & Yorke ...	*T. rhodesiense.* *T. pecorum* (= *T. congolense* ?). *T. simiae.*	*G. morsitans.*	N. Rhodesia.
Bruce, Harvey, Hamerton, Davy & Lady Bruce.	*T. simiae.*	*G. morsitans.*	Nyasaland.
Ph. Ross	T. of dimorphic type.	*G. longipennis.*	British E. Africa.
Kleine & Fischer ...	*T. gambiense.*	*G. morsitans.* *G. palpalis.*	G. E. Africa (Central).
Bruce, Harvey, Hamerton, Davy & Lady Bruce.	*T. caprae.*	*G. morsitans.*	Nyasaland.

These observations all point to the fact that, given favourable climatic conditions, any known pathogenic trypanosome can develop in any species of Glossina. Whether one or another species of tse-tse fly is specially favourable for the spread of trypanosome disease can only be answered by a series of parallel experiments conducted under similar conditions, and by further observations in nature. The author had the opportunity in Tanganyika of conducting transmission experiments with

T. rhodesiense and *G. palpalis*. The trypanosome was obtained from a case of sleeping sickness in Nyasaland.

The experimental procedure was as usual: 476 laboratory bred *G. palpalis* were fed in series for four days on an infected guinea-pig and after being starved for two days were fed on different healthy goats and monkeys. Trypanosomes were found for the first time in certain of the animals on the 32nd day. By dividing up the flies into groups it was found that, in all, 12 (2·5 per cent.) became infective. In addition developmental forms of trypanosomes were found in 9 other flies which had died by the 10th day.

Three of the infective flies were employed for the purpose of examining the infectivity of the parasites in the various organs. After they had been fed for two days on healthy animals they were killed with chloroform (40th day of the experiment = age of the fly). The salivary glands, proventriculus and intestine were then dissected out and separated and the contents injected into 9 healthy monkeys. All the animals proved to be infected on the 5th day afterwards. These results agree with those obtained by Kinghorn and Yorke with *G. morsitans* and *T. rhodesiense* (this *Bulletin*. Vol. 1. p. 268). They are however in striking contrast to those of Kleine and Eckard (*loc. cit.* Vol. 2. p. 32) and of Miss Robertson (*loc. cit.* Vol. 1. p. 267) the former of whom, working with *G. palpalis* and *T. gambiense*, did not succeed in infecting monkeys with the gut or proboscis contents of infective flies; only the contents of the salivary glands proved to be virulent.

Since it is probable that the developmental process of *T. rhodesiense* and *T. gambiense* in Glossina is similar, a reason must be sought for these different experimental results. The possibility that injury of the salivary glands during removal and consequent fouling of the other organs might account for the infectivity of the latter is considered, but the author is of opinion that the experiments are too numerous to allow of this interpretation. Possibly the age of the fly might offer an explanation; those employed by Kleine and Eckard were on an average 50 to 60 days old, whereas those of the present series of experiments were only 40 days old. To decide the point an infective fly was kept alive until the 54th day and then dissected. In this case only the monkey which received the salivary glands became infected. On microscopic examination very numerous trypanosomes were seen in a piece of the gut. Therefore the author concludes that the development of the trypanosomes in the intestine after a time gradually comes to an end and that the virulent parasites migrate into the salivary glands. [Kinghorn, Yorke and Lloyd found that both the contents of the salivary glands and also that of the intestine of two infective flies were virulent when injected into healthy animals 58 and 71 days after the infecting feed.]

W. Y.

Diesing. **Die Uebertragung der Schlafkrankheit durch den Geschlechtsakt.** [The Transmission of Sleeping Sickness by Sexual Intercourse.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Nov. Vol. 17. No. 22. pp. 786-788.

Reference is made to the fact that in South Kamerun the distribution of sleeping sickness and *Glossina palpalis* does not

always coincide: sometimes the insect is found without the disease, sometimes the disease without the insect. This fact supports the view that there must be another means of transmission. The author considers that possibly coitus may play an important part.

On his first journey to Kamerun in 1902 the author took with him four dogs of which one was infected with *T. lewisi* (sic). In the cage on the ship the dogs quarrelled and bit one another. Ten days later two other animals were found to be infected. The only explanation of this surprising result was that the virus had been transferred by direct contact of the wounds or by the tongue licking first a wound on the infected animal and then on a healthy animal.

When working with large numbers of horses, donkeys and cattle in Kamerun the author observed that those animals used for breeding purposes were always the earliest and most severely infected with trypanosomiasis. He came to the conclusion therefore that coitus must be responsible for the dissemination of the disease. Just as the trypanosome was transmitted in the dogs by direct contact of wounded surfaces, so it was quite likely that the same thing would happen in coitus where there were frequently small abrasions of the parts. Reference is made to the fact that this is the usual mode of transmission of dourine.

The author is of opinion that the two dozen infected Europeans who return to Europe each year to be treated constitute a danger, and suggests that an intermediate station should be established at the Canaries where these people could be treated efficiently.

W. Y.

Macfie (J. W. Scott). **Preliminary Note on the Development of a Human Trypanosome in the Gut of** *Stomoxys nigra*.—*Ann. Trop. Med. & Parasitology.* 1913. Nov. 7. Vol. 7. No. 3 B. pp. 359-362. With 1 text-fig.

A number of *Stomoxys nigra* were fed at Lagos on a guineapig infected with the human trypanosome which the author has called *T. nigeriense* (see this *Bulletin*, Vol. 2, p. 344). Thirteen of the flies were dissected from one to six days after the first feed. In six of them flagellates (Herpetomonas) were found in the mid-gut. As a control, twelve flies that had not fed on the infected animal were dissected. No flagellates were found in them.

As it was possible that the flies might have been naturally infected, experiments were begun with flies hatched out in the laboratory. Two experiments with a single fly were done. In each a laboratory bred fly which had hatched out the previous day was fed on an infected guinea-pig. The flies were killed and examined on the 3rd and 4th days respectively. Herpetomonas were found in the mid-gut of each: no flagellates were found in the proboscis or salivary glands. As a control two other laboratory bred *Stomoxys nigra* which had not fed on an infected guineapig were examined: no flagellates were found in either.

At this stage the work had to be abandoned, but the two experiments mentioned were quite definite and "would seem to

prove that the trypanosome with which the guineapig was infected was capable of development in the gut of *Stomoxys nigra*."

In Nigeria, in the native towns and European stations, stomoxys abound. If they are capable of serving as the intermediary host of human trypanosomiasis, they deserve greater consideration than they at present obtain.*

W. Y.

NEIVA (Arthur.) **Da Transmissão do *Trypanosoma cruzi* pela *Triatoma sordida* Stal.** [Transmission of *Trypanosoma cruzi* by *Triatoma sordida*.]—*Brazil Medico.* 1913. Aug. 8. Vol. 27. No. 30. p. 309.

In the city of Porto Nacional in the State of Goyaz, Brazil, the author found a difficulty in explaining the greater number of persons infected with *T. cruzi*, seeing that *Triatoma megista* was very infrequent. On the other hand an abundance of *T. sordida* was met with here and elsewhere. The author attempted to infect specimens of *T. sordida* by feeding them on guinea-pigs infected with *T. cruzi*. The bugs showed many flagellates in their gut. The dejecta, as expelled naturally, were collected and put in contact with the conjunctiva of guinea-pigs. These became infected within eight days.

A. G. B.

NEIVA (A.). **Multiplicação no Vinchuca (*Triatoma infestans*, Klug.) do Trypanosomo do Mal de Cadeiras.** [Multiplication in the Vinchuca of the Trypanosome of Mal de Caderas.]—*Brazil Medico.* 1913. Sept. 15. Vol. 27. No. 35. pp. 366-367.

A preliminary note, in which the author expresses the opinion that the capybara is not the wild host of the organism of mal de caderas, as suggested by ELMASSIAN and MIGONE. In the course of a long journey made on horseback through several states of Brazil for other purposes, he found no correspondence between the distribution of the capybara and the prevalence of mal de caderas. In several places where the inhabitants were not even familiar with the appearance of the capybara, mal de caderas was causing considerable ravages. The author also thinks that the gadflies of the genus Chrysops are much more likely to be the transmitters of the disease than *Stomoxys calcitrans*, as suggested by SIVORI and LÉCLER in 1902. Finally he briefly announces that he has been able experimentally to infect with the trypanosome (*T. equinum*) of mal de caderas the vinchuca (*Triatoma infestans*) without loss of virulence; its faeces, when placed upon the conjunctiva of guinea-pigs, proved infective at the end of 10 to 15 days.

W. Y.

* A. C. H. GRAY in Uganda in 1905 found and figured a Herpetomonas from three specimens of Stomoxys species. They had previously fed on a monkey infected with *T. gambiense*. "Practically unaltered" *T. gambiense* also were present in one of the flies 24 hours after feeding.—A. G. B.

Mitzmain (M. Bruin). **The Mechanical Transmission of Surra by *Tabanus striatus* Fabricus.**—*Philippine Jl. of Science.* Sec. B., Trop. Med. 1913. June. Vol. 8. No. 3. pp. 223-229.

An attempt was made to transmit surra mechanically by means of *Tabanus striatus*, which were for the most part bred from the egg; in some instances the flies were obtained from larvae taken from their aquatic habitats and in a few instances captured adult flies were employed.

In a table details are given of 16 experiments; the number of flies used in each was either one or two, except in two instances where it was 3 and 6 respectively. Three of the 16 experiments were positive. In the first of these, 3 flies bred from eggs were applied individually in tubes to an infected guinea-pig and allowed to feed from 30 to 90 seconds. They were then transferred to a healthy monkey after intervals of from 20 seconds to 3 minutes and allowed to feed until satisfied (5, 16 and 21 minutes respectively). Trypanosomes were found in the blood of the monkey 11 days later. In the second, two laboratory bred flies were fed on an infected horse for 40 to 45 seconds and then after intervals of 5 to 15 seconds permitted to complete their meal on a healthy horse, which subsequently became infected. The third experiment was similar to the second except that six caught flies were employed.

An effort was made to induce flies to feed on a healthy and on infected animals kept together in a large screened cage. The results were negative, the flies dying in a few days when kept within the enclosure.

The following are the conclusions:—

"1. *Tabanus striatus* Fabricus for the first time recorded has been found to play a rôle in the transmission of surra. Bred horseflies have been employed for the first time in such experiments. Errors resulting from naturally infected wild flies have thus been eliminated.

"2. Three experiments were successful in the direct or mechanical transmission by "interrupted" feeding when only a short interval was allowed between the bites on infected and healthy animals. In 16 experiments the minimum number of flies with which the infection could be transmitted was 2.

"3. Trypanosomes of surra were not found to be transmitted hereditarily in *Tabanus striatus* Fabricus.

"4. The contaminated labellum of the fly does not appear to be a factor in the conveyance of infection.

"5. The maximum length of time that *Trypanosoma evansi* has been demonstrated microscopically in the gut of this species of fly after feeding on infected blood is thirty hours; the organisms were found in the fly's dejecta two and one-half hours after biting the infected animal; and suspensions of flies, when injected subcutaneously, were found infective for animals for a period of ten hours after the flies had fed on infected blood."

W. Y.

Trypanosomiasis in relation to Wild Animals.

Duke (H. L.). **Some Trypanosomes recovered from Wild Game in Western Uganda.**—*Rept. of the Sleeping Sickness Commission of the Royal Society.* 1913. No. 14. pp. 37-59. With 4 plates and 1 map.

The Western Province of the Uganda Protectorate—a great game country with a relatively small population—was examined

with the object of obtaining information on the part played by wild game in the spread of trypanosomiasis. On the accompanying map the main data available regarding the distribution of the Glossina species are given. The bulk of the experiments were performed in areas where tsetse were more or less abundant.

The tsetse regions traversed may be roughly divided into four:—

District No. 1.—The north-west corner of Ankole Province, as defined by the north-east shore of Lake Edward, the Kazinga Channel and the south-west corner of Lake George.

District No. 2.—The parts of Toro Province from the northern bank of the Kazinga Channel to the neighbourhood of Mahokya and the Hima river.

District No. 3.—The Southern Toro Game Reserve, comprising the country round the northern end of Lake George, and running northwards nearly to Fort Portal.

District No. 4.—The Semliki valley north of the Mboga road.

A description is given of the physical characters and predominant game species of each of these districts. Another series of wild animals was shot in districts where no tsetse are known to occur; these experiments were to serve as a control to those on game in tsetse districts.

Technique.—The blood from the freshly killed animal was defibrinated, and at the same time two slides were taken for subsequent staining, each of which received from 20 to 30 mins. careful examination. In order to include as many species of trypanosomes as possible goats were used for the blood inoculations. It is regretted that it was not possible to devote a separate goat to each wild animal shot. At the beginning of the tour an attempt was made to set aside a goat for each species of game, and so to discover the relative infectivity of the different species. As time went on, however, this was found impossible: nevertheless a certain amount of grouping was maintained throughout the experiments, resulting in a "buffalo goat," a "waterbuck goat" and so on.

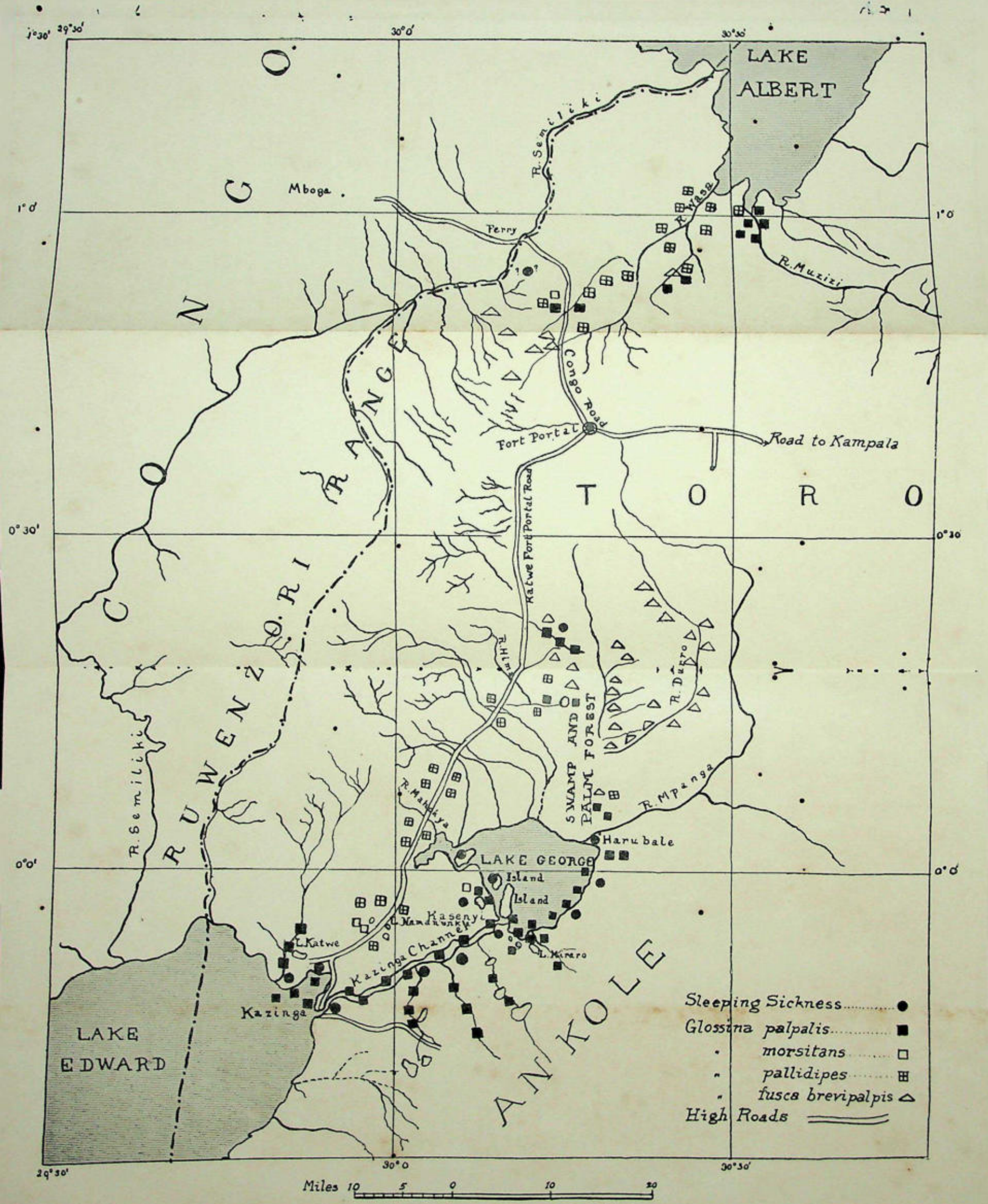
The following is a summary of the goats inoculated:—

Goat A.—Inoculated from 2 buffalo in the blood of which trypanosomes resembling *T. vivax*, *T. pecorum*, *T. uniforme* and another very suggestive of some *T. gambiense*-like organisms were found. Trypanosomes appeared in the goat on the 6th day after inoculation. Subinoculations were made into a second goat, 2 dogs, a rat, a monkey and a bullock. *T. pecorum* appeared in the blood of the dogs, the rat and the bullock. The monkey did not become infected. *T. uniforme* was seen in the blood of Goat A. The *gambiense*-like organism was also seen in the blood of this goat and also in the dog's blood.

Goat B.—This animal became positive after being inoculated with blood from 3 waterbuck. No parasites were seen in the blood slides of the buck. The goat unfortunately died owing to the carelessness of the porters.

Goat C.—This animal was inoculated with blood from 7 waterbuck, 3 elephant and 1 hartebeeste. It did not become infected. Parasites resembling *T. vivax* and *T. uniforme* were seen in blood films of one of the waterbuck.

Goat D.—Inoculated from 3 Uganda cob and 2 bushbuck, none of which showed trypanosomes in the blood. The goat became infected and subinoculations were made into a second goat, 2 dogs, 2 rats and a monkey. Only the goat became infected. The parasites found correspond to *T. nanum* and *T. uniforme*.



Outline Map of portion of WESTERN PROVINCE, UGANDA PROTECTORATE, to illustrate Dr. H. L. DUKE's paper.

Goat E.—Inoculated from 4 reedbuck and 1 bushbuck none of which showed trypanosomes in the blood. The goat became infected and subinoculations were made into 2 goats, a dog, a rat, a monkey and a guinea-pig all of which became infected. The trypanosomes found were *T. nanum*, *T. uniforme* and a trypanosome belonging to the *brucei-gambiense-pecaudi* group.

Goat F.—Inoculated from 9 buffalo and a warthog, one of which showed trypanosomes in the blood. The goat became infected and 2 dogs, 2 rats, and a monkey were subinoculated. These did not become infected. The goat was infected with *T. nanum* and *T. uniforme*.

Goat G.—Inoculated from 2 reedbuck, a bushbuck, an eland and a warthog, in none of which trypanosomes were found. The trypanosome found in the goat was *T. uniforme*.

Goat H.—Inoculated from 2 giant pigs, 3 waterbuck, a reedbuck, a cob and a colobus monkey, in blood films of none of which trypanosomes were found. The goat became infected and subinoculations were made into 3 rats, a monkey and a dog all of which remained negative. The parasites in the goat were *T. vivax* and *T. nanum*.

Goat I.—Inoculated from a buffalo and a hyaena; trypanosomes were found in the blood of the hyaena. The goat became infected and subinoculations were made into 5 rats, 2 monkeys and 2 dogs; a number of these animals became infected. The trypanosomes found were *T. pecorum*, *T. uniforme*, and a slender *T. gambiense*-like organism.

A number of animals including waterbuck (6), buffalo (7), reedbuck (3), mpala (6), eland (1), duiker (1), lion (1), hartebeeste (6), oribi (6), warthog (2) were shot in fly-free country and blood from them was inoculated into goats; all the goats remained negative. Trypanosomes were only found in one antelope—a duiker shot near Masaka—in the course of examination of these blood slides. This animal was shot a considerable distance from the lake shore in a region where tsetse are unknown. It is possible, however, that it may have sometime or other reached the fly zone on Lake Victoria.

In the fly area 52 animals were inoculated from and examined microscopically, and trypanosomes were found on at least 10 occasions, *i.e.*, 19 per cent., taking the lowest possible estimate of one infected wild animal to each infected goat. In the fly-free area 39 animals were similarly examined and trypanosomes were found in only one instance, *i.e.*, 2·5 per cent. There is, accordingly, no reason to doubt the significance of Glossina as trypanosome carriers among game, since Tabanids, Haematopota, Muscidae, Chrysops, &c., are common to both regions.

The following experiments were carried out with wild Glossina. These were fed upon clean monkeys which were subsequently examined daily; a certain number of flies were afterwards dissected with a view to examining roughly the gut and proboscis.

District 1.—368 *G. palpalis*, caught elsewhere than at Lake Kiraro, were fed upon a clean monkey without causing any infection. Of these 101 were dissected without any flagellates being discovered. 507 Kiraro flies were fed on a clean monkey which became infected subsequently. The 90 flies examined proved to be negative.

District 2.—117 *G. pallidipes* were fed on a monkey with negative results. One of 123 *G. pallidipes* dissected was found to contain trypanosomes in the gut; the proboscis and salivary glands were negative.

District 3.—210 *G. palpalis* were fed on monkeys and 191 dissected with negative results, whilst trypanosomes were found in the gut of one out of 157 dissected.

District 4.—298 *G. palpalis* were fed on monkeys with negative results; and of the 185 dissected 2 contained trypanosomes in the gut (proboscis negative, salivary glands not seen). The flagellates of Fly No. 1 showed

crithidiae, trypanosomes and intermediate forms suggestive of a single cycle; those of Fly No. 2 showed scarce slender trypanosomes. 48 *G. pallidipes* were fed on monkeys with negative results, and 59 were dissected, trypanosomes being found in the gut of one. 15 *G. fusca* were fed on monkeys with negative results and of 28 dissected trypanosomes were found in the gut of one only.

The diagnosis of the trypanosome obtained from wild tsetse caught at Kiraro Lake is dealt with in some detail. Both as regard morphology and pathogenicity it corresponds to the *brucei* and *rhodesiense* type, posterior nuclear forms being seen.

An account is given of the coincidence of distribution between certain species of tsetse and of game. *G. fusca* is chiefly confined to forest areas and in the author's experience elephant, giant pig and bushbuck are the most constant frequenters of these *fusca* haunts. The parts of Toro around Katwe, Mahokya, and Kasesse consist of short grass plains running up to the elephant-grass country around the Hima river. The whole of this area swarms with buffalo. *G. palpalis*, *pallidipes* and *morsitans* are found, but *fusca* appears to be most met with in the forests to the north and east of the Hima river. Hippo, where they occur, doubtless constitute the important food supply of *fusca*, but their range is limited to certain lakes and streams.

G. palpalis in the parts visited also occurs in the forested area only, differing from *fusca* in its confinement to the neighbourhood of water. In the consideration of its food supply man will take a prominent place, and hippo are very often found in the haunts of this tsetse.

G. pallidipes occurs throughout the buffalo district referred to above, and is chiefly found in open forest areas and in scrub country. It is also met with in isolated thickets a considerable distance from the scrub which borders the open tracts. It is thus mostly associated with reedbuck, buffalo, cob and especially waterbuck.

A species of *Hippobosca* was seen on almost every antelope shot in this part; as many as 12 were caught around one waterbuck. They were also taken on a reedbuck shot out on the plains far away from the scrub. This fly was never seen on game shot in the Semliki valley which is 3,000 to 4,000 feet lower than the rest of the country. It is possible that this species may play a part in the spread of trypanosomes, and in tsetse-free districts may account for the existence of disease amongst cattle. Dissection of 15 individuals of this fly proved negative.

The following are the conclusions:—

"1. A considerable portion of the wild game in the fly districts of the Western Province of the Uganda Protectorate is infected with trypanosomiasis.

"2. Certain of these trypanosomes have suspicious resemblance to the human trypanosomes, *T. gambiense* and *T. rhodesiense*. Others are known to be exceedingly pathogenic to domestic animals.

"3. The tsetse of these parts also contain flagellates which it is highly probable are derived from wild animals.

"4. The population of the fly districts is scanty, and the greater part has recently been moved to fly-free parts.

"5. It is reasonable to hope that, as regards the spread of human trypanosomiasis, the removal of the people from the infected districts will

suffice, and this measure will simultaneously prevent native cattle being exposed to the fly bite. The majority of the fly area is practically uninhabited country.

"6. The alternative of destroying the game, and so of abolishing what is doubtless a permanent trypanosome reservoir, would be a gigantic and almost impossible undertaking in this region. In considering such a proposal elephant must, of course, be included, as must also hippo, situtunga, bush pig and hyaena, all of which are difficult to eradicate. The scarcity of people is a serious objection to such a course, as is the difficult nature of the country. It would be well to await the trial of this expedient under more favourable conditions before undertaking so drastic a measure under severe natural handicaps.

"7. It would appear inadvisable to take any measures to protect the existing game and thereby encourage an increase in their numbers. On the other hand, it is inadvisable to permit natives to hunt in the fly districts. The ideal arrangement would be to make the fly districts prohibited areas, and in the region under consideration this is feasible to a far greater extent than would be the case in other parts of the Protectorate."

W. Y.

Clinical and Treatment.

Ringenbach (J.). Sur un Cas de Maladie du Sommeil chez l'Européen, avec Phénomènes cutanés particuliers.—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 628-631.

A clinical account of the disease in a European, infected in French Congo, is given with special reference to skin appearances. The patient became ill with violent fever on December 7, 1912. On the same day a button-like swelling appeared on the right shoulder; it was painful on pressure and gave the sensation of an incipient furuncle. The patient had been bitten at this point some days previously by an insect, which he did not see.

In spite of quinine the fever continued until January 1st and the patient wasted rapidly. During January the fever disappeared but reappeared again for 3 or 4 days at the beginning of February. On March 15th the patient observed on each arm over the deltoids a complete ring about 6 cm. in diameter, of a rose colour which did not disappear completely on pressure. At the same time other similar lesions of various sizes appeared on the arms, the chest and the back. These lesions have not disappeared since but, on the contrary, the patient is of opinion that they have increased from day to day; he had attributed their appearance to food poisoning. The only points which caused uneasiness were the progressive emaciation and a general lassitude.

The diagnosis was made at Brazzaville in January 1913. The cervical and epitrochlear glands were slightly enlarged and puncture of the former revealed a few trypanosomes. There was a papular urticarial erythematous rash of a circinate type on the arms, chest, abdomen, shoulders, back, and over the lumbar region. There were 17 circles, complete or incomplete, of a diameter varying from 2 to 11 cm.; the circular band was 5 to 10 mm. broad of a light rose colour with a slightly violet tinge; the colour did not disappear completely on pressure and was accentuated by cold, heat, and sweating and the patient in the last two conditions had a sensation of formication. The lesions protruded slightly, the skin maintained its natural suppleness and there was no desquamation; the rings were sharply defined internally but externally were ill defined and gradually merged with the skin of normal colour.

A brief account of the other symptoms is given. Under the influence of atoxyl the condition of the patient has rapidly improved.

W. Y.

Villaça (Hermenegildo). **Syndromo Ovariano na molestia Carlos Chagas.** [The Ovarian Complications of Chagas' Disease (Parasitic Thyroiditis).]—*Rev. Med. de S. Paulo.* 1913. May 15. Vol. 16. No. 9. pp. 163-168.

It appeared likely to the author that in female patients affected with Chagas's disease the hypertrophy or atrophy of the thyroid would be accompanied by a corresponding diminution or excess of activity in the ovary, the thyroid being the regulator of the activity of many other ductless glands. To test this hypothesis, 56 female patients of all ages were examined, all of whom were suffering from parasitic thyroiditis, and out of this number 25 exhibited decided symptoms of thyroid atrophy combined with excessive ovarian activity, indicated by precocious or profuse menstruation, while 15 showed thyroid enlargement accompanied by tardy or scanty menstruation. In the remaining 16 no correlation between the two functions could be detected.

The author concludes that in parasitic thyroiditis a correlation, in the inverse sense, between the activities of the thyroid and the ovaries can be clearly detected.

W. Y.

Aubert (P.), Monfort (F.), Heckenroth (F.), & Blanchard M.). **Le Salvarsan dans la Prophylaxie et le Traitement de la Trypanosomiase humaine.**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 632-634.

A number of cases of sleeping sickness in different stages of the disease were treated at Brazzaville with salvarsan. The salt was dissolved in distilled water in the proportion of 10 cgm. per 50 cc. of water. The results of treating 51 cases with doses of this drug, varying from ·5 cgm. to 1·7 cgm. per kilo of body weight in one or more injections, are given in two tables. Twelve escaped and five died in a few weeks without having presented trypanosomes in the blood or glands and before it was possible to judge of the result of the treatment. Twenty relapsed after intervals of from one to 12 months; and fifteen have remained free from relapses, but it is necessary to deduct from this number those in which observation has not been carried on sufficiently long and only to count those which have remained free longer than the case in which relapse was most delayed, that is 12 months. On this basis only one case has been cured by this medicament (no relapse for 16 months).

About 4 months is the average period of sterilization produced by a dose of the drug; this period is definitely prolonged by repetition of the dose. The drug is well borne by the blacks; it always improves the general condition and it is not rare to find a notable increase of weight in spite of the relapses. In two cases however the authors observed syncope with coldness and running pulse after injections of ·5 cgm. and 1 cgm. of the drug per kilo.

The authors compare these results with those of Broden, Rodhain and Corin (see this *Bulletin*, Vol. 1, p. 129). The more favourable results of the latter may be due to the fact that they administered larger doses (2-3 cgm. per kilo) of the drug.

W. Y.

Danysz (J.). **De l'Emploi de quelques Combinaisons medicamenteuses nouvelles dans le Traitement des Trypanosomiases.**—*Compt. Rend. Acad. Sci.* 1913. Oct. 20. Vol. 157. No. 16. pp. 644-646.

The fact that a certain number of micro-organisms become resistant to therapeutic agents has lead to the employment, simultaneously or successively, of several substances. The author has been able to shew that acquired tolerance of certain organisms to bactericidal products varies greatly according to the various substances which are employed as medicaments. Thus it is more easy to obtain resistance against sera, normally bactericidal, and metalloid salts than against alkaloids and above all metallic salts, which are the most powerful antiseptics *in vitro* but of hardly appreciable action *in vivo*. It is a question of a greater or less affinity of the antiseptic for the tissues of the host and for the parasite.

These considerations have induced the author to combine several kinds of active products in order to associate in the same molecule an elective affinity on the one hand and powerful antiseptic action on the other, *e.g.* dyes of benzidine, triphenylmethane or fluoresceine and salts of the metalloids and metals.

In the present paper the author only briefly indicates the results obtained in trypanosomiasis (*T. evansi* and *T. rhodesiense*) with such compounds.

An arseno-silver compound in which the ordinary reactions of silver are masked (the formula is to be published later), was prepared by acting on arsenobenzol with azotate of silver. A single injection of 5 mgm. of this preparation injected intravenously or intramuscularly sterilized the blood of rabbits of 2½ to 3 kilos infected with surra. Mice infected with the same trypanosome were cured by a subcutaneous injection of ·05 mgm. Mice bear 3 mgm. of the product without any appreciable reaction.

T. rhodesiense proved to be more resistant. In mice infected with this parasite it was necessary to inject ·1 mgm. to produce the same results as in the case of surra. On adding however quantities of trypan red, which alone in the same doses is absolutely inactive, one can lower the sterilising dose of the preceding compound by a half, so that mice infected with surra can be cured by ·02 mgm. and those infected with *T. rhodesiense* by ·05 mgm.

Doses of twice and three times the size of silver salts, atoxyl, arsenobenzol and trypan red, when injected separately, have only produced in the same cases slight effects.

W. Y.

Johnston (J. E. L.) & Macfie (J. W. Scott). **Observations on the Action on Trypanosomes of Certain Drugs and of *Staphylococcus pyogenes*.**—*Jl. London School Trop. Med.* 1913. Nov. Vol. 2. Pt. 3. pp. 207-212.

A few experiments were performed to determine the effects of dilute solutions of iodine, bromine and osmic acid on trypanosomes in cover-slip preparations. The results were rather inconclusive. The action of the osmic acid solution was a little more

intense than that of the other two substances, very few living trypanosomes being found in the preparations one hour after the beginning of the experiments.

In the treatment experiments the following solutions were used:—

Iodine.—Tinct. Iodine. ♏ 7, Aq. destil. ad. ʒ 1.

Bromine.—Bromine (2·5 p.c.) ♏ 7, Aq. destil. ad. ʒ 1.

Osmic acid.—Ac. osmic. (2 p.c.) ♏ 12, Aq. destil. ad. ʒ 1.

The trypanosomes employed were *T. vivax* in sheep and *T. lewisi* in rats. The solutions were given intravenously in sheep and subcutaneously in rats. The results were almost entirely of a negative character. Iodine and osmic acid appear to have a very disturbing effect, not only on the trypanosomes, but also unfortunately on the hosts.

The question of the mechanism of the destruction of trypanosomes in the living body is considered. As a result of their observations, the authors are of opinion that trypanophagocytosis occurs, and that large numbers of trypanosomes may be rapidly destroyed by this means.

Three rats infected with *T. lewisi* were treated with a staphylococcus vaccine. Several injections of from two to four million staphylococci were given at various intervals. In one of the animals there was a great reduction in the number of trypanosomes during treatment. The authors state that this might be construed as meaning that the trypanosomes were reduced by the effects of the staphylococcus vaccine to a vanishing point; and that in stopping the vaccine before cure was complete, the trypanosomes returned. However, as the vaccine produced no similar effects on the other two rats, it is probable that the variation in number of trypanosomes seen in the former experiment was merely the normal variation of *T. lewisi* over a prolonged period.

W. Y.

Morphology.

Shilston (A. W.). **Notes on Zululand Trypanosomes.**—*Union of S. Africa Dept. of Agriculture. Second Report of the Director of Veterinary Research.* 1912. Oct. pp. 345-361. With 1 coloured plate and 1 black and white plate.

This paper deals with two trypanosomes found in domestic stock in Zululand. The first of these strains was obtained by inoculating a dog with blood from a sick mule. A detailed description of the parasite is given. It was polymorphic, long free flagellar and short aflagellar varieties being found. The individuals were found to vary in length from 14 to 30 microns, the average being 19 microns. A chart is given showing the percentage distribution in respect of length. It has a general resemblance to that published by Bruce, prepared from slides of the original Zululand *T. brucei*, in that the bulk of the organisms lie between 15 and 20 microns. [The author does not state whether posterior nuclear forms were found although in the coloured plate illustrating the paper two short forms are drawn which approximate to the posterior nuclear forms.] The great variation in the

proportion of long and short forms of the parasite, on different days, is noted. The almost constant appearance of long forms at the beginning of infection led to a suspicion that one might be dealing with a double infection, the short form of trypanosome having a longer period of incubation than the long slender form. To settle this point resort was made to Bourri's method for isolating trypanosomes, in which a single trypanosome is isolated and inoculated into a laboratory animal. In all cases in which infection occurred both forms of the parasite appeared in the blood, proving that the strain was dimorphic, and not a mixture of two types.

The author compares this strain with the European strain of *T. brucei* (Plimmer and Bradford's). The latter parasite was found to correspond very closely to the description of *T. brucei* given by Laveran and Mesnil and others, but it differed in many important respects, notably in the absence of forms below 22 microns in length, from *T. brucei* as described by Bruce. [This is confirmatory of the observations of Stephens and Blacklock (see this *Bulletin*. Vol. 1. p. 662).] The author also examined films of *T. brucei* or *T. pecaudi* from the Soudan. This was very similar to the Zululand trypanosome.

The animal reactions of the Zululand parasite are given in a table. The conclusions are:—

1. That a trypanosome occurs in animals in Zululand which is markedly dimorphic, and in this and other respects closely resembles the trypanosome described by Sir David Bruce and others as *Trypanosoma brucei*.

2. That the trypanosome introduced into Europe in 1896 and described by various authorities as *Trypanosoma brucei*, differs to a marked degree from that described under the same name by Bruce, and from the Zululand trypanosome described above.

3. That a careful study of the trypanosomiasis of Zululand is necessary to determine, among other things, whether a trypanosome having the characters of *T. brucei* as formerly described, also exists in that country.

A brief account is also given of a short aflagellar trypanosome found in blood films of a number of naturally infected cattle and donkeys. This parasite is probably *T. pecorum*.

W. Y.

Blacklock (B.) & Yorke (W.). **The Trypanosome causing Dourine (Mal de Coït or Beschälseuche).** — *Proc. Roy. Soc.* 1913. Oct. 16. Vol. B 87. No. B 593. pp. 89-96. With 1 coloured plate.

The authors refer to the preliminary note published by them, summarised in *Sleeping Sickness Bulletin*, Vol. 4, p. 353, in which they pointed out that whilst examining the strain of *T. equiperdum* in the Runcorn laboratory, short parasites, certain of which exhibited a posterior displacement of the nucleus, were observed. This strain had been preserved at Runcorn since 1907, when it was brought from the Kaiserliches Gesundheitsamt. Fresh animals infected with this strain were obtained from Berlin; their parasites also showed posterior nuclear forms. The authors decided to

examine the various strains of this parasite and were able to collect three:—

Strain A. The Runcorn Laboratory strain. This was brought from Algiers in a horse suffering from dourine by the firm of Hagenbeck.

Strain B. Frankfurt strain, obtained in 1906 from Professor Ehrlich; origin unknown.

Strain C. East Prussian strain, the virus responsible for the East Prussian outbreak of *Beschälseuche* in horses in 1905.

Blacklock and Yorke made a careful study of the morphology of each strain in rats and guinea-pigs. 20,000 individuals of each were examined for the presence or absence of a free flagellum. The results are shown in a table. Whereas of the 20,000 individuals observed 1,321 aflagellar and spicule* forms were encountered in Strain A, only 18 and 86 similar forms were seen in Strains B and C respectively. This distinction was much more clearly brought out by examination of guinea-pigs than of rats. Adopting Laveran's scheme for the differentiation of pathogenic trypanosomes (*Sleeping Sickness Bulletin*. Vol. 3. p. 356) Strain A belongs to Group 3, whereas Strains B and C must be put in Group 1. Moreover certain of the short forms of Strain A have a posterior nucleus, whereas in B and C these forms are not found. Careful examination of Strains B and C showed only slight differences. The dimensions of the trypanosomes of each of the three strains, given in a table, are of little assistance. When the curves obtained by plotting out in percentages the various lengths of trypanosomes encountered in each strain are studied, it is found that in the case of rats the curves of each strain correspond fairly closely, but not those of guinea-pigs. The guinea-pig curve of A is that of a dimorphic trypanosome showing two widely separated peaks, whereas the curves of the other strains are curves of monomorphic trypanosomes.

It is pointed out that the species *T. equiperdum* was described by Doflein from the description given by Rouget in 1896, Rouget's strain having in the meantime died out. In Rouget's original paper the account of the morphology of the trypanosome is vague. All subsequent authors agree that *T. equiperdum* is a monomorphic parasite in which all forms are furnished with a free flagellum.

The authors state that "it is important to record that we are unable to distinguish morphologically the parasite of Hagenbeck's dourine horse from *T. rhodesiense*, *T. pecaudi* or *T. ugandae* (*T. brucei*, Uganda)." They hesitate to suggest that it is identical with any of these, in view of the fact that it produced in a horse symptoms clinically known as dourine. They are at present conducting experiments to find out whether these three strains are still capable after numerous passages through laboratory animals of being transmitted in equines by coitus. For the present they give this trypanosome the name *T. equi*.

A. G. B.

* Parasites in which the flagellum is free to the extent of about 1μ or less.

CARPENTER (G. D. H.). **Second Report on the Bionomics of *Glossina fuscipes* (= *palpalis*) of Uganda.**—*Reports of the Sleeping Sickness Commission of the Royal Society.* 1913. No. 14. pp. 1-33. With a map and 35 figures.

The first Report was published in No. 12 of the Reports of the Sleeping Sickness Commission and was summarised in Vol. 1, p. 48, of this *Bulletin*. It contained an account of work done up to August, 1911. Until the end of the year the work was continued on Damba Island, and subsequently a year was spent on the largest of the Sesse Islands, Bugalla. The neighbourhood of the latter camp is described, with a sketch map. With respect to the specific name of this fly Carpenter has examined the hypopygia of 60 of the Sesse Island flies and compared the structure with those of flies from the mainland. They all agree exactly, so that this and the former Report deal only with the form described as '*fuscipes*.' The genital armature is figured.

Length of life of the fly.—The marking experiments carried out at Jinja (mainland) between July and October were repeated at Bugalla at a different time of year. The flies were marked by amputation through the tibia or femur of one or other leg; 9,012 flies were so marked and liberated between March 18th and April 26th, 1912. The results are given in a table, which shows the dates of marking, the number of each sex marked, and the number of marked flies, male and female, caught day by day up to February 28th following. None were retaken after January 17th. The table shows that the minimum length of life for a male fly was 247-253 days and for a female 126-131 days.

Influence of Climate.—Climatic conditions are considered to have a marked effect upon the total numbers of the flies, the proportions of the sexes, and the rate of larviposition. This is illustrated by charts. The conclusions are as follows:—

"1. Decreased relative humidity is unfavourable to the adult fly.

"2. Higher temperatures are particularly unfavourable to the female sex.

"3. There is an inverse relation between relative humidity and rate of larviposition."

Carpenter is of opinion that adverse climatic conditions are extremely important, being the main check upon unlimited increase of the fly.

Natural Enemies.—During two and a half years Carpenter has not succeeded in finding any enemies of importance. No parasites were reared from many thousands of pupae. He does not think that this species is devoured by birds. It is out of the way of the larger insectivorous birds of powerful flight which would alone be capable of catching such an active insect. A table gives the results of the examination of the stomach contents of 64 insectivorous birds shot in fly areas; 116 in all have been examined with negative results. He notes that bacilli are nearly always to be found in the fore part of the fore gut both in bred and wild flies; in the Progress Report 19 per cent. was the percentage stated.

Food Supply.—Carpenter has studied the percentage proportion of mammalian (M) and non-mammalian (N) blood at the three localities at which he has worked.

Table IV.

Date.	Locality.	No. of flies examined.	No. of flies in which nature of blood recognisable.	M °/₀	N °/₀
Nov. 7, 1910, to Feb. 10, 1911.	Jinja (mainland).	600	92	31·5 °/₀	68·5 °/₀
Mar. 23, 1911, to Dec. 18, 1911.	Damba Isle	695	177	15·2 °/₀	84·8 °/₀
Jan. 12, 1912, to Jan. 14, 1913.	Bugalla Isle	1,000	246	68·7 °/₀	31·3 °/₀

He explains the excess of M at Bugalla by the great abundance of Speke's tragelaph, which, he states, are more within reach of the fly than on Damba Island. He mentions also hippopotami and otters as a source of mammalian blood and notes that when there are fresh tracks of Varanus, a large monitor lizard, the proportion of N to M on that day is much greater than the average.

Non-mammalian blood might be drawn from birds, reptiles, amphibia, or the lung fish; flies have been seen swarming on Varanus. Carpenter notes that the corpuscles of the lung fish are so enormous that only one at a time could be drawn up the proboscis. He criticises the paper by Bruce, Hamerton, Bateman and Mackie on the Natural Food of *Glossina palpalis* (see *Sleeping Sickness Bulletin*, Vol. 2, p. 245), in which the authors found that of 20 flies 7 had probably fed from a bird and 13 from a reptile or amphibian. He has made careful researches on this point which cannot be given in any detail here. Altogether 46 specimens of red blood corpuscles from tsetse flies were measured; they are arranged in groups in descending order of length of corpuscle. 18 were believed to have come from crocodiles, 25 from Varanus and 2 from cormorants.

Table IX.

Source.	Percentage.	Actual No.	Source.	Percentage.	Actual No.
Avian	4·3	2	Saurian ...	56·8	25
Reptilian ...	95·7	44	Crocodile...	40·9	18
Amphibian ...	0	0	? Tortoise ..	2·3	1
	100·0	46	—	100·0	44

"It thus appears that reptilian blood is over 20 times more often found in wild flies than avian and that it is probably derived from saurians more often than from crocodiles . . . . . The table embodies the results of examinations of many hundreds of flies."

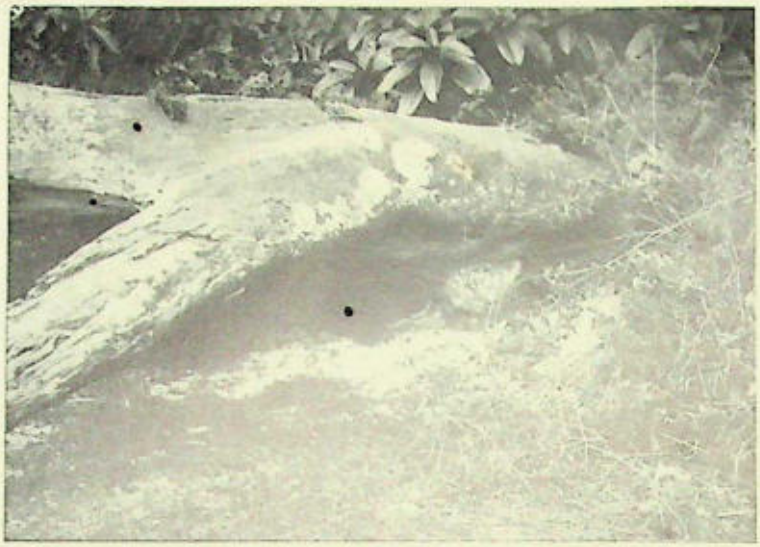


Fig. 1.



Fig. 2.

Typical sites for collections of pupae.
Both only a few yards from edge of water and a few feet above it.

[Reproduced from the *Reports of the Sleeping Sickness Commission of the Royal Society*, 1913, No. 14, by permission of the Controller of H.M. Stationery Office.]

Since the first Report the gut contents of 1239 flies have been examined with a view to seeing whether they had fed upon vegetable juices. Numerous bodies of apparently vegetable nature are figured. The discovery of a certain acarine on a proboscis is thought to suggest that the fly had plunged it into a gall. In one fly out of 1,000 examined on Bugalla an Ostracod Crustacean of minute size was found; it might have been sucked up by the fly's proboscis. Carpenter concludes that Glossina does suck up water.

Trypanosomes.—In January 1912 flies were fed on a young monkey at Bugalla. After 7,538 flies had been put on it it showed trypanosomes (March). The monkey was examined about every week till the following February, when it was liberated; it was always in the best of health and spirits; trypanosomes having all the appearance of *T. gambiense* were last seen in December. Further figures are given with regard to the carmine granules which appear to be associated with trypanosomes. A table shows that trypanosomes were found in the gut of flies twice as often at Damba as in Bugalla and at Jinja six times as often.

Table XII gives the sex proportion in three localities.

Table XII.

Locality.	Time.	No. of flies on which result was based.	Female percentage.
Jinja (mainland)	July, 1910, to Feb., 1911 ...	12,773	55·7
Damba Island ...	March, 1911, to Dec., 1911 ...	Over 6,000	21·6
Bugalla Island ...	Jan., 1912, to Feb., 1913 ...	56,675	20·6

With regard to the reason for these differences Carpenter thinks that the percentage of wild female flies seems to depend upon the effect of temperature upon the flies themselves.

Breeding Grounds.—The author is quite convinced that a localised breeding ground is not by any means a necessity. Comparatively few pupae were found on Bugalla, though flies were, if anything, more numerous there than on Damba, where an important breeding ground exists (see former Report). Two pupal sites are figured. The prospects, he writes, of getting rid of Glossina by limiting one's attention to localised breeding grounds are not good. A useful intimation of the site of pupae is often afforded by the pits of a species of ant-lion. It is noted that a live Glossina pupa is much harder to see than an empty shell, owing to the skin being covered by very fine particles of sand or earth.

[A necessarily inadequate account of this interesting paper; readers should procure the original Report which also contains a valuable paper by Dr. Duke, summarised elsewhere in this number.]

A. G. B.

UNCLASSED.

LAVERAN (A.). **Au Sujet des Infections des Souris par le *Trypanosoma duttoni*.**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 626-627.

The author received 6 grey mice (*Mus morio*) infected with *Trypanosoma duttoni* in May, 1911, from Senegal. Two of these mice were kept in Paris. One died on March 14, 1913, and the other on July 25, 1913; in other words the infection lasted 22 months in one case and 26 months in the other. The mice appear to have died of old age. Trypanosomes were seen in their blood at all times when examined, the infection being of long duration.

The other *Mus morio* were killed in 1911 for the purpose of inoculating white mice. In the white mice the infection was generally of short duration. In two cases the infection, which was slight, appeared to have died out after 7 and 4 months respectively. Among 8 other white mice the average duration of infection, always slight, was 84 days. The progeny of infected white mice are not immune. In one case a young white mouse was inoculated intraperitoneally when about a month old; the course of the infection was rapid, terminating in death after 34 days.

H. B. Fantham.

PRINGAULT (E.). **Contribution à l'Etude des Trypanosomes de l'Afrique Mineure.**—*Arch. Inst. Pasteur Tunis.* 1913. No. 1-2. pp. 119-120.

The author's intention was to study spirilla in *Vespertilionis kuhli*, but as their blood proved not to contain any, attention was given to the trypanosomes of the bats. Of 109 examined 33 per cent. showed trypanosomes, 15·6 per cent. showing small forms, 17·4 per cent. large forms. The author notes that the percentage of infections surpasses that found by W. L. YAKIMOFF and NINA KOHL-YAKIMOFF (5 per cent.) and that of C. NICOLLE and C. COMTE (22·3 per cent.). The suggestion is put forward that this may be because the examinations were done in the present case during the hot season when the disease may be more widespread. Inoculations into rats and mice of the blood of bats gave negative results, as did also the inoculation of emulsion of bugs suspected of conveying the disease.

T. lewisi.—The author examined 152 rats, *M. Decumanus*, and found 32·2 per cent. infected.

W. Y.

MARTOGLIO (F.). **Sulla Morfologia del *Trypanosoma cellii*.**—*Ann. d'Igiene Sperimentale.* 1913. Vol. 23. (New Ser.) No. 3. pp. 363-366.

The author refers to a previous paper in which he mentioned three types of trypanosome disease present in Italian Somaliland, the native names of which are "ghindi" or "gol," "gobiat." and "salaf." Ghindi, he states, is transmitted by *Glossina palli-dipes*; in the transmission of gobiat importance attaches to

Stomoxys, chiefly *S. nigra* Macq., and possibly research carried out on the spot may prove that *G. pallidipes* takes part in it. Salaf (of dromedaries) is transmitted by Tabanidae, especially Pangonia, *e.g.*, *P. magrettii* and *P. beckeri*.

The author named the trypanosome of gobiat, *T. cellii*, because its pathogenic action on dogs, rabbits, rats and mice appeared to differentiate it from *T. dimorphon*.

In bovines infected with the virus, which was maintained in the laboratory for about three years, forms are found which are quite different from the trypanosome form. These forms comprise (1) irregularly rounded forms presenting active segmentation of the nucleus and blepharoplast, into 2, 4 and 6. Short flagella are seen inside some of these forms. These bodies measure 20 to 25 μ by 10 to 12 μ. (2) Leishmania-like forms with a definite rounded protoplasmic body, and two masses of chromatin, a smaller and a larger. These measure from 2 to 4 μ by 4 to 7 μ to 4 to 8 μ by 9 to 19 μ. (3) Leishmania-like forms are found in the organs, lungs, liver, spleen, bone marrow, more frequently than in the circulating blood, and in the heart muscle sometimes nests of bodies are found containing nucleus and blepharoplast. The author believes these forms are concerned with a second type of schizogony differing from that by binary fission, and supports the view of Doflein that the genus Leishmania should be classified under the family Trypanosomidae.

H. B. F.

Mendeleeff-Goldberg (Polina). **Die Immunitätsfrage bei der Trypanosomenkrankheit der Frösche.**—*Arch. f. Protistenkunde.* 1913. Oct. 10. Vol. 31. No. 2. pp. 241-276. With 2 plates and 9 text-figs.

The author considers that the trypanosomes of *Rana esculenta* and *R. temporaria* are identical. By reason of the production of immune substances in the frog and on account of the adaptability of the parasites, the latter show different appearances in the different organs. Crithidial forms are produced after the reaction against the immune substances. Seasonal differentiation has been seen neither in the large vegetative nor in the small, cultural forms. The trypanosomes only multiply when the immunity of the frog dwindles, as under conditions of high temperature or hunger. Infected frog blood can kill and dissolve trypanosomes. Inactivated frog blood kept for half an hour at 60° C. loses its defensive immunity products. Fresh guinea-pig serum then added to it will make it active again. The immunity product is of the nature of an amboceptor. The life cycle of the frog trypanosome is simple. Trypanosomes from the frog pass into the intermediate host and then at the time of metamorphosis are transmitted to the tadpole.

H. B. F.

Ogawa (M.). **Sur un Trypanosome de** *Triton pyrrhogaster*.—*Compt. Rend. Soc. Biol.* 1913. Oct. 24. Vol. 75. No. 29. pp. 268-271. With 18 text-figs.

The trypanosome was found in *Triton pyrrhogaster* in South Japan. The host is a tailed Amphibian, in which group trypanosomes have only once been found before. In the flagellate stage the organism is large, 57·6 μ to 80·8 μ in body length. The aflagellar end is pointed.

The trypanosome has been cultivated on the Novy-MacNeal medium, and on blood-bouillon. Crithidial forms occur in the cultures on the third day and increase in number for a month. Leishmania forms, about 6 μ in diameter, appear at the beginning of culture. Crithidial forms in the cultures on blood-bouillon are sometimes very long. Old cultures on blood-agar, from twelve days old, show rounded forms without free flagella. These may be vacuolated and multinucleate, with several blepharoplasts. The spherical nucleus of cultural forms exhibits a distinct nuclear membrane with about 8 chromatin masses abutting on it, and a karyosome.

The trypanosome shows differences of size from the only other known Urodele trypanosome, *T. diemyctuli*, and therefore is considered a new species, *T. tritonis*.

H. B. F.

MALARIA.

FALCIONI (Domenico). **Osservazioni Epidemiologiche, Profilattiche e Curative fatte durante la Campagna Antimalarica 1911.** [Epidemiological, Prophylactic and Therapeutic Observations made during the Antimalarial Campaign of 1911.]—From vol. "*In Onore del Prof. Angelo Celli, nel 25 Anno di Insegnamento.* 1913. pp. 305-323. [Turin: Unione Tip.-Editrice Torinese.]

The author, as medical officer to one of the most malarious of the suburbs of Rome, gives an account of his experiences, though he has not very much that is novel to record. Like the majority of Italian sanitary officers occupied with similar duties, he has a good deal of complaint to make with regard to the unwillingness of the Italian labourer to take his prophylactic dose of quinine regularly, when working in a malarious locality. The efforts of the Italian Government to colonize its insalubrious districts are thus in great measure frustrated. Seasonal workers are particularly troublesome in this respect, and carry away the infection to their homes, there to develop it at leisure. To delay colonization until the last pool is drained and the last mosquito is exterminated does not seem possible.

The effect of hard work and privation in predisposing to relapses is very marked in the author's district. The rate of malarial sickness goes up in the spring long before the mosquitoes become plentiful, owing to the resumption of field-work in the month of April; and the lack of apparent connexion between the prevalence of malaria and the number of mosquitoes might be difficult to explain if enquiry did not show that all the cases occurring give a history of previous infection.

A. Balfour.

MARTELLI (Pier Nello). **La Campagna Antimalarica ad Alberese (Grosseto) nel 1912.** — *Propaganda Antimalarica.* 1913. Aug. 31. Vol. 6. No. 4. pp. 81-92.

Of late years the Italian Government has made serious efforts to reclaim the large tract of land known as the Tuscan Maremma, through which the railway line from Pisa to Rome passes. The principal town of this district is Grosseto. During the malarious season the Government stations a special medical officer at Alborese, within the reclaimed area, to watch over the health of the inhabitants; and in the present paper the author gives an account of his experiences in that capacity during the summer and autumn of 1912.

About 17,000 acres of marshland have been brought into cultivation under the Government scheme of operations, and there are now about 220 persons settled permanently on this area of land in Government-built houses with suitable out-buildings. In addition about double this number of immigrants enter the district every year, in the summer as harvesters, and in the

winter as woodcutters and workers on building and drainage operations. For the latter class the accommodation provided is much less suitable, consisting of barns and other buildings with hammocks for sleeping purposes provided by the authorities. It is difficult to exercise any personal supervision over this latter class of workers, and, though they are all furnished with quinine, they will not, as a rule, trouble to take it as a daily prophylactic, so that the amount of malarial disease met with is considerable, and apparently of a severe type. Doses of from one to two grammes of quinine are necessary to subdue the access of the fever, and a continuance of a daily dose of a gramme for 15 to 20 days is necessary to prevent a recurrence. Of the children in the district, nearly one-half came under the author's care for attacks of malaria.

In spite of the obstacles presented by the indolence and ignorance of the Italian peasant, the author thinks that the progress made with the scheme of reclamation is remarkably good. He would, however, like to see the importation of casual labour from a distance stopped altogether, as these immigrants can with difficulty be brought to see the necessity for complying with anti-malarial precautions, and their conditions of feeding and lodging, as a rule, leave much to be desired.

A. B.

Howe (W. B. W.). **The Propagation of Tertian Malaria in the Mountains of North Carolina, Henderson County in Particular.** —*Southern Med. Jl.* 1913. Nov. Vol. 6. No. 11. pp. 732-733.

The author shows that benign tertian malaria exists in the mountains of North Carolina at 2200 feet and is associated with the presence of *Anopheles crucians* and *A. punctipennis*. The former is known to transmit the disease.

A. B.

Henson (Graham E.). **Malaria: Etiology, Pathology, Diagnosis, Prophylaxis and Treatment. (With an Introduction by Charles C. Bass.)**—190 pp. With 27 text illustrations and 1 coloured plate. 1913. London: Henry Kimpton. Glasgow: Alexander Stenhouse. [10*s.* 6*d.* net.]

A review of this book appears on pp. 59-61.

Clinical.

Patterson (J. F.). **The Cerebral Form of Pernicious Malaria.**—*Jl. Amer. Med. Assoc.* 1913. Nov. 15. Vol. 61. No. 20. pp. 1807-1809.

The cerebral form of pernicious malaria may simulate any organic disease of the brain and sometimes the resemblance is so close that a blood examination alone will establish the diagnosis. The author recognises the following types of cerebral malaria (1) comatose; (2) motor irritative; (3) motor depressive. He

describes them in some detail, the first being the most frequent and being characterised by fibrillary twitching of the muscles of the extremities along with the usual symptoms of coma. If diaphoresis and recovery do not occur, the coma deepens and death results, usually from pulmonary oedema. The motor irritative type presents symptoms varying from mere muscle twitching to clonic convulsions. It may simulate uraemia, hysteria or tetanus. The motor depressive form is very rare. Indeed LANDOUZY could only collect twelve cases in all the literature. There is paralysis of the monoplegic, paraplegic or hemiplegic type, the paralysis generally commencing and subsiding with the malarial paroxysm. Interesting cases illustrative of all the three types of cerebral malaria are described, and the author also quotes certain records showing that patients admitted to hospital as insane were found to be suffering from cerebral malaria. He mentions a case of this kind which came under his own observation and where the symptoms of confusion lasted more than two months.

A. B.

RUBINO (Gaetano). **Un Caso di Perniciosa Malarica a Sindrome Meningitica con Linfocitosi del Liquido Cerebro-spinale.**—*Rivista Ospedaliera.* 1913. July 31. Vol. 3. No. 14. pp. 610-611.

A child, nine years old, was admitted to hospital. Eight days previously it had been attacked with abdominal pains and diarrhoea, accompanied by fever. The temperature continued high with only partial remissions. On admission the case appeared grave, with sensibility blunted, rigid back and retracted head. The pupils were unequal, the pulse 160 per minute and the temperature 38·8° C. Owing to the rigidity of the abdomen, the examination of the abdominal organs was unsatisfactory, and on account of the general hyperaesthesia, retracted head and exaggerated reflexes, meningitis was diagnosed and a lumbar puncture performed. The fluid removed contained 0·5 gramme per mille of albumen, and showed numerous lymphocytes in the sediment. A second puncture gave similar results. No special treatment was therefore adopted, and the child died three days afterwards in clonic convulsions.

Towards the end, on account of the rapid aggravation of the symptoms, the blood was examined, when aestivo-autumnal parasites were found in abundance. Quinine was then given, but too late. Post-mortem, the liver and spleen were found to be distinctly enlarged, while the meninges showed only extreme congestion.

The case is cited to confirm the observation of PENDE who found lymphocytosis of the cerebro-spinal fluid in two cases out of five of pernicious malarial fever, but it is instructive also from another point of view.

A. B.

Sergent (Edm. & Et.), Béguet (M.), & Plantier (A.). **Observations microscopiques au Cours d'un Accès pernicieux paludéen.**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 615-617. With 1 coloured plate.

The authors describe certain appearances seen in the blood of a native (? Algerian) child, three years of age, whom they found in a state of coma as the result of an attack of pernicious malaria. These appearances they class as (1) lesions of the parasite-containing red cells, (2) peculiar elongated forms of the young parasites. A coloured plate illustrates both conditions.

1. The authors recall the earlier work of the brothers Sergent on the so-called *corps en pessaire*. The lesions they now describe resemble in some measure these "pessary bodies" but are formed in a different manner. They occur only in the infected erythrocytes and are in the form of red rings usually exactly coinciding with the outlines of the red cells, *i.e.* each corpuscle looks as though it were surrounded by a red ring which has the appearance of possessing a double contour. This distinguishes them from somewhat similar forms observed by Billet. Occasionally the red ring is situated well within the red cell being separated from the margin of the latter by a circular band of corpuscular substance.

2. The elongated young parasites present different shapes, but are best described as streaks of blue-staining protoplasm and of chromatin which, occasionally, are thrown into the form of loops or irregular rings. They resemble the young schizonts often seen in quartan infections and were noted by Ziemann in 1906.

[These elongated, young forms of *P. falciparum* have been seen every now and again in the Anglo-Egyptian Sudan. They do not seem to have any special significance but are apt to be mistaken for young quartan parasites. A suitable name in English for the above-mentioned corpuscular lesions would appear to be "ringed red cells."]

A. B.

Pepe (T.). **Febbri Comitate.** [Complicated Fevers.]—*Gaz. d. Ospedali e d. Cliniche.* 1913. Sept. 21. Vol. 34. No. 113. pp. 1175-1176.

A brief account of four cases of atypical malarial fever occurring in the writer's practice, in which the true cause of the affection would probably have been overlooked if it had not been for the systematic examination of the blood for parasites. The first case was that of an elderly man who presented the clinical signs of left-sided croupous pneumonia, along with an enlarged liver and spleen. The case was treated with quinine. Within 24 hours the patient was sitting up in bed with a normal temperature. The lung-symptoms however re-appeared within the following 24 hours, but were again subdued by the same means. The second case was that of a young man who was found in bed in a state of algid collapse with vomiting and diarrhoea. In this case also liver and spleen were perceptibly enlarged. A hypodermic injection of quinine was given, and the patient

recovered. The blood showed parasites. In the third case, that of a child, aged eight years, the patient was brought to the writer because of an alarming swelling of the left eye, which accompanied an intermittent attack of fever and sweating of tertian type. A much enlarged spleen was detected, and the blood, upon examination, showed parasites. Sufficient dosage with quinine and a cold lotion to the eye got rid of all symptoms very quickly. The last case was that of a man who had been suffering from attacks of malaria which had yielded to quinine, and who, while walking in the street, was seized with right-sided paralysis. He was taken into a house, and remained unconscious for four days. Every other day he had a rigor and fever. The examination of the blood for parasites gave a positive result, and quinine was administered. The fever then disappeared and the hemiplegia began to improve, so that at the end of two months no trace of paralysis remained. The author therefore diagnosed cerebral thrombosis due to parasites. The four cases are narrated with a view of laying stress on the necessity of invariably examining the blood in cases of sudden illness, in a malarial locality.

A. B.

Fraga (Ch.). **Le Foie dans le Paludisme Chronique (Etude de son Etat physique et fonctionnel).**—*Rev. de Méd.* 1913. Oct. 10. Vol. 33. No. 10. pp. 816-828.

This is a paper from Brazil, read before the Tropical Medicine Section of the International Congress of Medicine. The author's views are sufficiently indicated in his list of conclusions which are as follows:—

1. Chronic malaria does not induce grave changes in the liver. The alterations produced are usually fleeting, slight and curable by ordinary means.

2. As a rule physical examination reveals no change but sometimes it is possible to make out an increase in size of the liver, which may be tender on palpation.

3. The physical examination is wholly confirmed by the usual tests for functional activity.

4. Serious liver trouble in chronic malaria is due to concomitant causes, more especially alcoholism and insufficient nourishment.

An account of eight cases is given in confirmation of these views.

A. B.

Tissier & Brumpt. **A propos d'un Cas de Paludisme congénital.**—*Arch. Mensuelles d'Obstétr. et de Gynécol.* 1913. Feb. Vol. 2. No. 2. pp. 166-174. With 3 text-figs.

According to the authors there have been hitherto only two well authenticated and undoubted cases of congenital malaria recorded. Both occurred in Algiers and were due respectively to infection with *P. falciparum* and *P. malariae*. They now record very fully and carefully a third case in which the infection was of the benign tertian type, *P. vivax* being found in the peripheral blood of both mother and child. The former acquired

malaria in Algiers at the beginning of her sixth pregnancy. Later she left Africa and resided constantly at Neuilly, a Parisian suburb, suffering frequently from malarial paroxysms. She was treated with quinine and arsenic and eventually was safely delivered of a male child. Unfortunately, in the anxiety regarding the case the blood of the umbilical cord was not examined. Neither was that of the placenta. The child appeared healthy but on the 19th day suffered from convulsive movements and an attack of fever, which lasted about three hours. The fever recurred and eventually the mother herself noticed the similarity of the child's attacks to those from which she used to suffer. At a later date the child's blood was examined and, as stated, *P. vivax* was found. It was also present in the mother's blood on the same date. The authors believe that the case was an example of true infection *in utero* and not of inoculation of the infant's blood at the time of birth as a result of placental laceration. They regard the long incubation period as against the latter view. Any question of the child's being infected in the natural way at Neuilly may be put out of account. A description of the blood findings both in the mother and child is given and the so-called panoptic staining method of Pappenheim is given in detail as a foot-note.

Charts show the child's temperature and its increase in weight under successful intramuscular injections of quinine hydrochloride.

A. B.

Heiser (Victor G.). **Malaria in the Newborn.** [Correspondence.] —*Med. Record.* 1913. Nov. 8. Vol. 84. No. 19. p. 855.

The author, who is Director of Health for the Philippine Islands, recognising the desirability of collecting data regarding the question of maternal transmission of malaria records the following case:—

"A child, Filipino, born January 2, 1913, at the Iwahig Penal Colony in Palawan, on January 7 had a rise in temperature and symptoms which led to the suspicion that it might be infected with malaria. Examination of the blood made on January 9 showed distinct malarial crescents. The mother had suffered from estivoautumnal infection at intervals during her pregnancy. For a number of months prior to December 25 she had been actively treated with daily gram doses of quinine sulphate given in capsules by the mouth."

A. B.

Treatment.

Grothusen. **Ein Beitrag zur Behandlung der Malaria.** [A Contribution to the Treatment of Malaria.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Nov. Vol. 17. No. 22. pp. 783-785.

The author, writing from German East Africa, states that as a result of his experience there he has been led to discard giving quinine by the mouth and now employs intramuscular injection. He finds the latter method preferable because:—1. The quinine

is better absorbed and acts better, especially during the febrile paroxysm. 2. It is pleasanter for the patient. 3. It is of advantage to the physician with regard to dosage, &c.

He discusses the question under these three headings, pointing out that he employs the bimuriate of quinine in daily doses of half a gramme injected not into the buttocks but into the biceps of the upper arm. Provided one is careful to avoid going too close to the anterior, radial border of the muscle there is no danger of injuring the anterior circumflex artery or the cephalic vein. Grothusen has given many hundreds of successful injections in this manner. The natives prefer the injection to quinine by the mouth. In fact the method is so popular that men who have been treated bring their wives and children to be injected.

An account of four cases successfully treated by this means concludes the paper.

A. B.

Parrot (L. M.). **Sur l'Administration des Sels de Quinine en Médecine infantile.**—*Rev. de Méd. et Hyg. Trop.* 1913. Vol. 10. No. 2. pp. 89-92.

The author thinks that the treatment of malaria in children, at least as regards the dosage and method of administration of the quinine salts, is a subject which is either poorly or insufficiently considered in the classical works on malaria. He believes that an account of his personal experiences on this matter may be useful. Taking up first the question of posology he recalls the maxim of Comby to the effect that children are very tolerant of quinine. In ordinary cases he is accustomed to give ten centigrams of a quinine salt for each year of the child's age, administering it, if by injection, in a single dose daily, if by the mouth, in divided doses two or three times in 24 hours. In severe cases there need be no hesitation in doubling the dose.

The following table shows his method of procedure in such cases:—

From 3 months to 1 year ...	0·15 gm.	to	0·25 gm.	per diem.
From 1 year to 3 years ...	0·25 ,,	,,	0·40 ,,	,,
From 3 years to 5 years ...	0·40 ,,	,,	0·50 ,,	,,
From 5 years to 10 years ...	0·50 ,,	,,	0·60 ,,	,,

As the tasteless salts are less active than those which are bitter he gives the former in doses of 20 centigrammes for each year of age.

Turning to methods of administration, he mentions rectal injections and the use of quinine inunctions only to dismiss them. The difficulties of giving quinine by the mouth in the case of children may be surmounted by administering the tasteless salts or by concealing the taste of the bitter preparations. The latter method fails in children over 4 years of age who readily detect the fraud whether sugar or chocolate is employed as the covering agent. Hence tasteless preparations, such as euquinine or aristochine, are better for general use. They may be given in suspension in water, milk, &c., but the author specially recommends pastilles or other chocolate preparations of aristochine. Pastilles, however, should

not be followed by an acidulated drink as the latter will decompose any aristochine remaining in the mouth. They should be washed down by a glass of pure water or better an alkaline water.

Provided the quinine be given intramuscularly the author regards injection as the method of choice. Strict asepsis and sufficient dilution, *i.e.*, 0·25 gm. of the salt to 1 c.c. are required. The injections should be made in the buttock and the author gives directions as to the best method of carrying these out in the case of infants and small children. He employs the bihydrochlorate or the chlorhydro-sulphate in a solution of 1 to 4 in distilled water and warns against the use of so-called quinine serum or isotonic quinine which contains chloride of sodium.

M. Granjux in criticising this paper considered the dose recommended by the author as erring a little on the large side in the case of children under three years. For infants at the breast quinine may be given to the mother.

A. B.

Cutter (John Ashburton). **Neosalvarsan and Malaria: A Personal Experience.**—*New York Med. Jl.* 1913. Nov. 1. Vol. 98. No. 18. [Whole No. 1822.] pp. 864-865.

The author got his first attack of malaria in 1888. From this he apparently completely recovered and was infected afresh in 1898. From this date he has continued a victim to the disease and apparently acquired a new infection in 1912. In the following year, being still far from well despite large doses of quinine, he was treated with neosalvarsan. It produced unpleasant symptoms such as pain in the chest and intestinal colic but appeared to benefit his general condition. The author admits that he does not know how thoroughly cured he is but evidently pins his faith to neosalvarsan.

[Unfortunately what might have been an interesting and instructive paper is spoiled by the way in which it is written and by the omission of any account of certain necessary observations. Beyond a casual note to the effect that plasmodia were not present in the blood there is no account of the haematological findings. The type of infection is not stated, there is no record of differential leucocyte counts, the condition of the blood is not described. Further the urobilin test was apparently not applied, and though the author states his intention of making his presentation as clinically complete as possible we learn nothing of the actual state of his spleen, liver or kidneys. Apparently the neosalvarsan was given straight away without any careful examination of the patient who may be congratulated on escaping alive! It seems a pity that a medical man should have allowed himself to be treated throughout in what was apparently a very haphazard and careless manner and one from which no definite conclusions can be drawn.]

Dr. Ayres reports another case of chronic malaria [? type] in which neosalvarsan, 0·9 grammes, given on two occasions served to effect a cure.

A. B.

Sheard, Jr. (Charles). **A Case of Malaria treated with Neosalvarsan.**—*Canadian Practitioner & Review.* 1913. Oct. Vol. 38. No. 10. pp. 588-591.

An account of a case of benign tertian malaria which was greatly benefited, if not wholly cured, by a single dose of neosalvarsan. Infection was apparently acquired in one of the New England States and the neosalvarsan in a dose of 0·9 gm. was given intravenously six hours before the next rise of temperature was due. The latter did not occur, parasites disappeared from the blood, and the patient remained to all appearance perfectly well up to the time [period not stated] of his discharge from hospital.

A. B.

Fontoynont & Razafimpanilo. **Du Traitement du Paludisme par l'Hectine.**—*Rev. de Méd. et Hyg. Trop.* 1913. Vol. 10. No. 2. pp. 77-81.

In Madagascar the authors have obtained excellent results in treating malaria by the use of Hectine [the sodium salt of Benzosulpho-p-aminophenylarsonate]. Its action resembles that of the cacodylates and of di-sodium methylarsinate [arrhenal]. The cures which it effects appear to be more lasting than those obtained by the use of arrhenal.

Hectine is valuable in cases where quinine is contra-indicated. It may also be given instead of quinine and, still better, in association with it. It is administered in intramuscular injection in doses of 10 and sometimes of 20 centigrams. From a study of the blood of their malarial cases the authors conclude that—

1. Hectine may be given in all cases of malaria save in pernicious attacks, where a rapid action is required and quinine is the sheet anchor.
2. In cases where there is a leucopenia or even a hypoleucocytosis, and such cases are frequently seen in severe malaria in Madagascar and elsewhere, hectine will succeed where quinine fails to destroy the parasites.
3. In such cases it is advisable to give 3 or 4 injections of hectine, then to resort to quinine injections, and then, abandoning these, to complete the cure by means of hectine, arrhenal or quinquina powder.

Hectine has a marked beneficial effect on the general state of the patient and is usually well borne, though occasionally the injections seem to cause some pain. The histories of eight cases of malaria in natives treated with hectine are given in proof of the above statements.

In a discussion on this paper, while the efficiency of hectine was confirmed, it was stated that the results are apt to be uncertain, especially in the case of children.

A. B.

McCulloch (H. D.). **Irradiation of the Spleen in Malaria and Other Affections.**—*Med. World.* 1913. Oct. 9. Vol. 1. No. 10. pp. 370-371.

After reference to a paper by Manonkhine of St. Petersburg on leucocytolysis, to previous work of his own on the same subject, and

to earlier personal experiences on X-ray therapy in chronic malarial splenitis, the author gives abstracts from a paper by Skinner and Carson on the successful treatment of enlarged malarial spleen by irradiation. Five cases of febrile malaria are there recorded and it is stated that the application of X-rays in cases of malarial fever relieves splenic pain and reduces recent engorgement, that the temperature falls and does not usually rise again, and that recovery is not attended by the anaemia usually present in cases treated with quinine. Further, cases resistant to quinine have yielded promptly to the rays. Cases of *chronic* splenic induration in natives were under treatment, but, so far, no definite statement could be made regarding them. Reference is made to three cases of splenic and hepatic hypertrophy in Englishmen submitted to X-ray therapy by the author in 1907-08 with very gratifying results.

He concludes his paper by stating his theory as regards the action of X-rays. He regards them as what is termed a "fourth state of matter," a most potent molecular agency which influences cells according to their individual molecular complexity and their relative instability.

A. B.

Quénu & Degrais. **Splénomégalie d'Origine paludique traitée avec Succès par le Radium.**—*Bulls. et Mém. Soc. de Chirurgie de Paris.* 1913. Nov. 18. Vol. 39. No. 34. pp. 1449-1451.

A case of marked chronic malarial splenomegaly in a Frenchman resident in Cochin-China was treated with most gratifying results by the exposure of the splenic tumours to radium emanations. Particulars of the treatment are given. The applications caused some cutaneous irritation and a little pain, but effected a rapid reduction in the size of the spleen and between May 3rd and June 28th altered the character of the differential leucocyte count. The authors remark that they are aware that radium treatment has not always succeeded in similar cases but they were much gratified by its effects in the present instance.

[Although there seems little doubt that the splenomegaly was of malarial origin it is worth noting that parasites were not found in the peripheral blood.]

A. B.

Prophylaxis.

Ruge. **Schwierigkeiten bei der Chininprophylaxe.** [Difficulties in Quinine Prophylaxis.]—*Jl. State Med.* 1913. Sept. Vol. 21. No. 9. pp. 564-567.

The author cites numerous examples showing how the efficacy of quinine prophylaxis varies in different countries, under different conditions of administrations and amongst different classes of the community, as, for example, the individual European civilian in the tropics and European troops under medical control and supervision. This variation has tended in some measure to bring quinine prophylaxis into disrepute and Ruge's paper is useful in directing attention to the factors on which it depends and showing that the prophylaxis must be adapted to

circumstances and to environment if the best results are to be achieved. It is, of course, essential in all cases of quinine prophylaxis that the drug be given regularly and in a form which ensures proper absorption but, even when this is done, the method sometimes fails for reasons of which we are still ignorant. As SERGENT has pointed out, the good-will and co-operation of all concerned are essential if quinine prophylaxis is to be successful. The author remarks that these are best secured by taking care that the type of prophylaxis employed is not of a nature to cause severe or unpleasant effects. In order to gain a proper understanding of the difficulties which, at the present time, beset the question of quinine prophylaxis he proposes—

1. That in the tropics the method of ZIEMANN and NOCHT be employed, *i.e.* one gramme of quinine every fourth day, given in doses of 0·25 gramme.

2. That an enquiry be instituted to test the efficacy of the method where small daily doses of quinine 0·25 to 0·3 grammes or, if desired, 0·2 grammes daily, morning and evening, are given with the exception of two consecutive days in the week, say Saturday and Sunday. No quinine is to be taken on those days.

3. That deductions should only be drawn when the prophylaxis has been carried out under medical supervision and in the case of persons who have not previously suffered from malaria.

4. That the necessity for varying the type of prophylaxis according to the locality be kept in mind.

A. B.

MOREAU (Laurent). **Prophylaxie du Paludisme dans l'Afrique Orientale Allemande.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 561-571.

An account of the means taken to combat malaria in German East Africa during the last twelve years.

At the time the railway was constructed from Dar-es-Salam to Tabora the disease claimed many victims but the engineering works carried out, and especially the drainage of swamps, have been productive of benefit. Petrolage has not proved very efficacious and experiments with larvivorous fish are now being conducted. It is, however, individual prophylaxis which claims the greatest attention.

In addition to the taking of quinine there is a very elaborate system of mechanical protection, but the special feature of the German system is the application of the principles of individual prophylaxis to the native community, in other words to the chief "carriers" of the disease.

Systematic weekly examinations are made of the blood of all those inhabiting the native quarters in Dar-es-Salam, and presumably elsewhere, and anyone found harbouring malarial parasites has to undergo an intensive quinine treatment whether or not he is suffering from fever. The village is divided into sections for convenience of inspection and in such a way as to prevent individuals being overlooked or escaping the examination.

It is recognised that the itinerant native is even more dangerous than the stay-at-home one, as members of caravans

visit endemic centres of malaria and act as distributors of the disease. Hence caravans have their police and blood examinations are practised all along the routes which they follow.

These methods were advised a dozen years ago by KOCH and OLWIG and, while the author states that one must not draw conclusions at too early a period, it would seem that already they have been followed by gratifying results.

Thus the mortality amongst natives which was about 50 per cent. has considerably diminished, coincidently with the disappearance of the plasmodia from the blood. Cases of malaria in Europeans have fallen from 40 per cent. to 10 or 15 per cent. and no longer exhibit the severity seen in former days. Blackwater fever and pernicious forms of malaria are now only observed at long intervals.

The author pays a tribute to the spirit and devotion of the numerous official personnel which has accomplished so much good and thorough work.

[There can be no doubt that in the past the efficient treatment of the human "carrier" has not received the attention it deserves. It is usually very difficult to carry out properly amongst native communities and one would have been glad of more detailed information regarding the intensive quinine treatment which has apparently been so successfully employed in German East Africa.]

A. B.

THOMPSON (H. N.). **The Prophylactic Use of Quinine.**—*H. R. Army Med. Corps.* 1913. Nov. Vol. 21. No. 5. pp. 587-589.

As a result of experimental work in the case of British troops at Lucknow in 1910 and 1911 the author has come to the conclusion that quinine prophylaxis is useless and may even be harmful. [As in the first series of experiments the dose was manifestly inadequate and as there is nothing to show in what form quinine was used and that precautions were taken to see that it was properly *absorbed*, the paper does not call for detailed notice. It would be well for anyone reading it to consult at the same time that by ENGELAND (see this *Bulletin*, Vol. 2, p. 337), and the article by RUGE (see above).]

A. B.

CULTIVATION.

SERGENT (Edm. & Et.), BÉGUET (M.), & PLANTIER (A.). **Sur la Culture *in vitro* du Parasite du Paludisme, d'après la Méthode de Bass.**—*Compt. Rend. Soc. Biol.* 1913. Oct. 31. Vol. 75. No. 30. pp. 324-326.

Yet another contribution to the rapidly increasing literature on this subject. The three cases which yielded the parasites for the experiment were all malignant tertian. One only had been given quinine prior to the blood being taken. In each instance some development took place. In the case where quinine had been administered the complete evolution of one generation of *P. praecox*

[*Laverania malariae*] from small rings to merozoites was traced. In one of the other cases a further stage was reached and the infection of red cells by a new brood of very young parasites was observed. The authors believe that for successful culture the temperature must be above 37° C. [See, however, review of paper by J. G. and D. Thomson in this *Bulletin*, Vol. 2, pp. 554-556.] In the tubes, when evolution ceases, the parasites are destroyed either by phagocytosis or by a spontaneous degeneration, the changes resembling those seen in plasmodia killed by quinine.

Crescents become elliptical and remain for a long time without showing any signs of parthenogenesis. The authors excluded the source of error mentioned by Da Rocha-Lima and Werner (see this *Bulletin*, Vol. 2, p. 340), *i.e.* mistaking a mere persistence of unchanged young forms for young parasites of a new generation.

A. B.

Ross (G. A. Park). **A Fictitious Native Disease (Isigwebedhla).**—*Ann. Trop. Med. & Parasit.* 1913. Nov. 7. Vol. 7. No. 3 B. pp. 371-376.

The author has found that the disease called in Zululand Isigwebedhla is merely an advanced stage of tropical malaria. He believes it has been exploited and its symptoms exaggerated by native doctors, more especially the Tongas, to serve their own ends. The nature of the deception is described and the paper is rather out of the common and of considerable interest having notes on native methods of diagnosis and treatment.

A. B.

Book Reviews.

Henson (Graham E.). **Malaria: Etiology, Pathology, Diagnosis, Prophylaxis and Treatment. (With an introduction by Charles C. Bass.)**—190 pp. With 27 text illustrations and 1 coloured plate. 1913. London: Henry Kimpton. Glasgow: Alexander Stenhouse. [10*s.* 6*d.* net.]

This is undoubtedly a useful book. It is of a convenient size; it is well arranged; for the most part it is clearly and carefully written; the majority of the illustrations are good and it is well up-to-date.

On the other hand, while there are few errors, there are some notable omissions which, it is hoped, will be made good in a future edition.

The brief historical account with which it opens leaves little to be desired, but there is no allusion to the pioneer work of Beauperthuy. For a work of this type, the notes on geographical distribution may be deemed sufficient. Some interesting figures are given as regards the economic loss which malaria has caused in Italy, India and the United States. In the case of the last named, Howard has estimated that malaria costs the country the enormous sum of one hundred million dollars annually.

Turning now to etiology, we find the author adopts Craig's classification of the species of plasmodia and admits a quotidian variety of *P. falciparum*. He also accepts the view advanced by Schaudinn and upheld by Craig as to gametes being derived from the ordinary sporulating forms through some action on the part of the human host and not from any separate class of sporozoites. This chapter (No. 2) is one of the best in the book. On p. 43, there is a useful table showing the chief differences between the four species of plasmodia described. A second table, setting

forth the characteristics of the different young or ring forms, might with advantage have been included. In this connection it may be noted that while the photomicrographs taken from CRAIG's work are excellent, the same cannot be said of Figs. 1 & 9. Again, the coloured plate of the cycle in man and the mosquito might have been better.

Chapter 3 deals with the mosquito carrier. It gives the impression that it has been written chiefly for workers in the New World and it is certainly strange that there are no illustrations of anopheline eggs, larvae or pupae. The development of the plasmodia in the mosquito is taken verbatim from CRAIG. Chapter 4 considers the predisposing factors in the etiology of the disease. The author believes congenital malaria does not occur though he admits the question is still *sub judice*. He attributes the fever to the liberation of a toxin but makes no mention of the possible rôle played by the pigment, haematin (Wade H. BROWN). The question of the human carrier is considered and more especially of heavily infected gamete carriers, and on page 68 the author cites an interesting example of the part which such carriers may play in ensuring the persistence of endemic malaria.

The section on the cultivation of malarial plasmodia is a recapitulation of the work by BASS & JOHNS.

The chapter on pathology, complications, sequelae and prognosis is concise and useful. It is a pity, however, that the author follows CRAIG in his classification of leucocytes. It is, the reviewer thinks, essential that the true large mononuclear cell, often a pigment bearer, should be clearly distinguished from the large lymphocyte. It is gratifying to note that the author lays stress on the importance of recognising the co-existence of malaria and ankylostomiasis. As regards sequelae his remarks on nephritis are worthy of attention. The effect of repeated attacks of malaria on the kidneys is apt to be forgotten.

The chapter on diagnosis is well done and the author's condemnation of the therapeutic test deserves attention. On pages 105-6 will be found his modification of the thick film method of JAMES. It is said to save time and to give good results. The few pages devoted to differential diagnosis will repay perusal. Elsewhere the occurrence of abdominal pain in tropical malaria receives well-merited notice and the gastric type of pernicious malaria is mentioned, but on page 107 there is an interesting account of a case of benign tertian malaria simulating appendicitis. The masking of malaria infection by abdominal symptoms is one which must not be ignored and is also one with which our British text books have hitherto failed to deal adequately. It is perhaps on the clinical side that the work under review comes most into prominence. The chapter on latency is not very satisfying, though as regards the etiology of malarial recurrence the author adopts the view of Ross which is now generally accepted, *i.e.*, asexual reproduction by schizogony. His account of the literature on parthenogenesis is, however, incomplete and he attributes more importance to CRAIG's observations on intracorpuscular conjugation than perhaps they deserve. One would here ask, as one has asked before, why has this phenomenon only been observed by American investigators? As regards prophylaxis Henson is in favour of the method of taking 5 grains of quinine daily. Under the chemical means of dealing with mosquitoes there should have been some mention of fumigation with cresyl and the use of the Giemsa spray, while a note on the destruction of imagines on board trains and steamers would have been welcome.

The last chapter is devoted to treatment and is also one of the best in the book. DARLING's research on the action of quinine on gametes is mentioned, as is BASS's view that the destruction or rather eradication of gametes is really due to the action of quinine on the schizonts from which they are derived. The source of origin is destroyed and the already formed gametes eventually die of old age. A new idea is voiced by the author on page 163. He asks if early and efficient treatment in original infections produces a relative immunity to later reinfection. He thinks the rapid destruction of the young parasites may result in the formation of anti-bodies which confer immunity for a certain time. The point is worthy of consideration but it is naturally very difficult to prove or disprove such an hypothesis.

The use of quinine in gelatine capsules for oral administration is advocated while for what the author calls "hypodermatic" administration, he employs ampoules each containing 0·30 gramme of quinine bihydrochloride carbamid, one to three for a dose in pernicious cases. There is little else that calls for special notice. Nothing is said regarding quinine haemoglobinuria, and the question of blackwater fever is completely ignored. Even if one accepts CRAIG's view that blackwater is a specific entity and in no way related to malaria, it is surely advisable with our present knowledge to make some allusion to the condition in a new work on malaria! Another omission, in the section dealing with diagnosis, is the failure to mention the urobilin test which is likely to prove of considerable value in latent and masked malaria where other causes of urobilinuria can be excluded.

Under treatment the use of salvarsan is mentioned only to be condemned. Sodium cacodylate is considered but not recommended. Nothing is said about hectine which finds favour with some French physicians. Picric acid has a section to itself. It is considered worthy of further investigation.

This book has been reviewed in some detail because it is the latest exposition on a most important subject which is rightly attracting greater attention every day. It is a good and a useful book but, as indicated, it is by no means a perfect book and it can be improved in some ways. It is to aid the author in this direction as well as to guide the reader that such criticisms as have been made were penned. We think the work is likely to be deservedly popular, more especially amongst those who have to combat malaria in the Western Hemisphere.

Andrew Balfour.

RUSSELL (Harold), [B.A., F.Z.S., M.B.O.U.]. **The Flea. (Cambridge Manuals No. 74.)**—xii. + 125 pp. With 9 illustrations. 1913. Cambridge, at the University Press. [1*s.* net in cloth; 2*s.* 6*d.* net in leather.]

Within the compass of 121 small pages there is here to be found a very good account of the flea, and a fair historic statement of its pathogenic importance to man, also appendices containing instructions for collecting and preserving fleas, bibliographic landmarks, and a list of British fleas and their hosts. The subject is presented in a way that will interest the general reader and also impress the student; but beyond this it contains a good deal that comes within the purview of the investigator of tropical disease, to whom a knowledge of the structure, post-embryonic development, habits, idiosyncrasies, hosts, and adaptive modifications of this order of insects—such as is here very clearly given—is essential. The chapters on the human flea and other species that commonly attack man—including chigoes—and on the fleas that are commonly found on rats are also of practical interest.

In such a mass of interesting information as is collected in this little book it is inevitable that some statements must be open to criticism; it is therefore necessary to point out—the matter being one of great practical importance—that the statement that "the adult flea can apparently continue for some time to reproduce itself without a meal of any sort" is hardly justified by the most recent observations and experiments, particularly by those of BACOT on *Ceratophyllus fasciatus*.

The author is rather too much addicted to speculation that borders on fine irony: for instance, the proposition that "the absence of eyes" (in bat fleas) "lends colour to the suggestion that fleas which are blind have lost their eyes because they had no need of them" sounds almost like the humour of Dean SWIFT. He is also too much inclined to apologise for the existence of fleas and of "the humble but ridiculous systematist," who, though "the utilitarian despises" him, may "yet become a benefactor of humanity" by studying such ignoble forms of life. Let Mr. Russell work at his fleas with an even mind. As CARLYLE said: "All work, even cotton-spinning, is noble. There is endless hope in work, were it even work at making money"—or experimenting with fleas and lice, so the experiments are well-devised.

A. Alcock.

WALL (F.), [Major, I.M.S., C.M.Z.S.]. **The Poisonous Terrestrial Snakes of our British Indian Dominions (including Ceylon) and how to Recognize them. With Symptoms of Snake Poisoning and Treatment.**—x. + 149 + iv. pp. With 42 text-figs. Third Edition. 1913. Bombay: Published by the Bombay Natural History Society. [Price 3 Rupees.]

The third edition of this little work consists of three parts, the first of which is occupied in the main by diagnoses of the venomous snakes of India, while the second and third parts deal, respectively, with their venom and the treatment of their bite.

In his preliminary classification of snakes, although the author adopts the accepted natural classification, he openly discards the anatomical generalizations upon which that classification is based, and expresses it in his own way in correlative terms of scales. Similarly, in differentiating the venomous from the non-venomous species, he rivets his eye upon the scales and the tail, and pays but scant attention to certain very obvious facts of dentition. It is claimed for this procedure that it is simple; but it is very doubtful whether it is simpler to distinguish, for example, the kraits from certain harmless snakes that have the same curious vertebral scales, by a minute examination of the scales of other regions, when a single look for a poison-fang, or for its mucous sheath, would at once settle the question. On every ground it seems advisable to emphasize the fact that the most mischievous, and in ordinary circumstances the most obvious, possession of a venomous snake is its channelled fang for injecting its venom. Apart however from this general criticism, the specific diagnoses of the venomous snakes are good and have evidently been drawn up with very assiduous care. Great attention has also been bestowed upon the geographical range of each species, though the author is not quite correct in his statement that the banded krait does not occur in North-West India, since it has been found in that part of British Baluchistan which borders on the North-West Frontier Province.

In the second part, which deals with the specific venoms, so far as these have been studied, the toxic constituents of the venom and their exact physiological action are tabulated for each species, and as far as is possible the clinical symptoms also of the bite are described and well illustrated from records of cases. It is a pity that nothing is said of the venom-apparatus, of the manner in which the venom is injected, or of the various circumstances which may modify the virulence of a venom.

As regards treatment of snake-bite, which is very fully discussed in the third part, the author quite rightly and naturally is an academic advocate of suitable antivenine. Where no such antivenine is available and the venom is one that is powerfully haemolytic and haemorrhagic he points to adrenalin, pituitary extract, and calcium salts. He has much to say against, and very little to say in favour of, local treatment by ligature, excision, and the application of permanganate of potash.

A. Alcock.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 2.

AMOEBIASIS AND DYSENTERY.

Amoebiasis.

Walker (Ernest Linwood) & Sellards (Andrew Watson). **Experimental Entamoebic Dysentery.**—*Philippine Jl. of Science. Sect. B. Trop. Med.* 1913. August. Vol. 7. No. 4. pp 253-331, with 1 plate.

This is a paper of extreme importance and great interest, but it contains so much valuable experimental work, and is of such length, that it is quite impossible to do justice to it in any abstract.

The authors set themselves the task of attempting to elucidate most of the disputed points concerning the rôle played by the various amoebae and entamoebae in the production of dysentery and the scope of their work and results and conclusions obtained can only be fully appreciated by reading the entire paper. All that can be here given is the summary and conclusions, which appear below *in toto*.

Summary and Conclusions. By Ernest Linwood Walker.

"This investigation was undertaken to determine experimentally the etiologic relationship of different species of amoeboid organizms to endemic tropical dysentery. It has consisted of 60 feeding experiments with the different species of *Amoeba* and *Entamoeba* that have been implicated in the production of this disease.

These experiments differ from those hitherto performed (1) in the number of comparative tests made of different species; (2) in that the experiments have been more carefully controlled, and especially in that the species of amoeboid organizm fed to, and recovered from, the experimental animal in every case have been determined; and (3) in the fact that the experiments have been made not upon the lower animals but upon man.

A. Twenty feedings of cultures, representing 13 strains and 8 species of *Amoeba*, isolated from the Manila water supply and other non-parasitic sources, from the stools of healthy persons or persons suffering from diseases other than dysentery, and from dysenteric stools, have been given to 10 different men, with the following results:—

1. The *Amoebae*, when ingested by men, can usually be recovered in cultures from their stools on Musgrave and Clegg's medium during the first few days after feeding, but never subsequently.

2. Microscopic examination of the stools of men after ingesting cultures of amoebae have been invariably and constantly negative.

(C3.) Wt.P.2413—35.22.12.13. 2000. 1.14. B. & F. G.11/4. A

3. None of the men who ingested cultures of amoebae have developed dysentery.

4. Therefore, the following conclusions appear to be warranted :—

(*a*) The cultivable amoebae are incapable of living parasitically in the intestinal tract of man.

(*b*) The amoebae, when obtained in cultures from stools, intestinal contents, or liver-abscess pus, are derived either from cultural contaminations or from encysted amoebae which have been ingested with water or food and have passed unchanged through the intestinal tract.

(*c*) The cultivable amoebae are non-pathogenic, and consequently play no rôle in the etiology of endemic tropical dysentery.

B. Twenty feedings with 5 strains of *Entamoeba coli* have been given to twenty different men with the following results :—

1. Cultures on Musgrave and Clegg's medium of the stools of men who have ingested *Entamoeba coli* have been invariably negative.

2. On the other hand, *Entamoeba coli* has been found microscopically, after a short incubation period, in the stools of every man who became parasitized, and the entamoebae have persisted in the stools of these men for an indefinite time.

3. Of the 20 men who ingested *Entamoeba coli*, 17 became parasitized at the first feeding, and 3 who did not become parasitized were reserved as controls.

4. The incubation period of *Entamoeba coli*, as determined by these experimental parasitizations, varies from one to eleven days, with an average of 4.7 days.

5. None of the 17 men experimentally parasitized, nor the 3 non-parasitized controls, have developed dysentery.

6. From these results, the following conclusions appear warranted :—

(*a*) *Entamoeba coli*, unlike the *Amoebae*, is a strict or obligatory parasite, and cannot be cultivated on Musgrave and Clegg's medium.

(*b*) *Entamoeba coli* is non-pathogenic, and consequently plays no rôle in the etiology of endemic tropical dysentery.

C. Twenty feeding experiments with *Entamoeba histolytica* have been made on 20 volunteers, with the following results :—

1. Cultures on Musgrave and Clegg's medium of the stools of men who have ingested *Entamoeba histolytica* have been invariably negative.

2. Microscopic examinations, on the other hand, have shown *Entamoeba histolytica*, after a short incubation period, in the stools of every man who became parasitized, and the entamoebae have persisted in the stools of these men for an indefinite time.

3. Of the 20 men who ingested *Entamoeba histolytica*, 17 became parasitized after the first feeding, 1 required 3 feedings before becoming permanently parasitized, and 2 who did not become parasitized at the first feeding were reserved as controls.

4. The incubation period of *Entamoeba histolytica* in these experimentally parasitized men has been found from one to 44 days with an average of 9 days.

5. In these experiments it has been possible to obtain :—

(*a*) Encysted "*Entamoeba tetragena*" exclusively in the stools of men who had ingested motile *Entamoeba histolytica* only.

(*b*) Motile *Entamoeba histolytica* exclusively in the dysenteric stools of men who had ingested "*tetragena*" cysts only.

(*c*) An alternation of "*tetragena*" cysts and motile *Entamoeba histolytica* several times repeated in the stools of a man who had ingested "*tetragena*" cysts only, and having attacks of dysentery alternating with normal stools.

6. Of the 18 men experimentally parasitized with *Entamoeba histolytica*, 4, or 22·2 per cent., have up to the present time, developed entamoebic dysentery.

7. The incubation period of the dysentery in these experimental infections has been 20, 95, 87, and 57 days, respectively, with an average of 64·8 days.

(Copied from THEODOSIO S. ESPINOSA'S Plate in the *Philippine Jl. of Science*, Vol. 8, Sec. B, No. 4.

The original figures were drawn from fixed and stained preparations at the magnification of Zeiss $\frac{1}{12}$ oil-immersion objective, ocular 3, and tube length of 160 millimeters, and with the aid of a camera lucida.

FIG. 1.—Motile form of a typical *Amoeba*, cultivated from the Manila water supply. Note the small size, central arrangement of the chromatin in the nucleus, and the contractile vacuole.

FIG. 2.—Encysted form of the same species of *Amoeba*. Note the small size and single nucleus with central arrangement of the chromatin.

FIG. 3.—Motile form of *Entamoeba coli*, from the stool of a healthy person. Note the dense, granular structure of the cytoplasm, the relatively large amount of chromatin, and its peripheral arrangement in the nucleus.

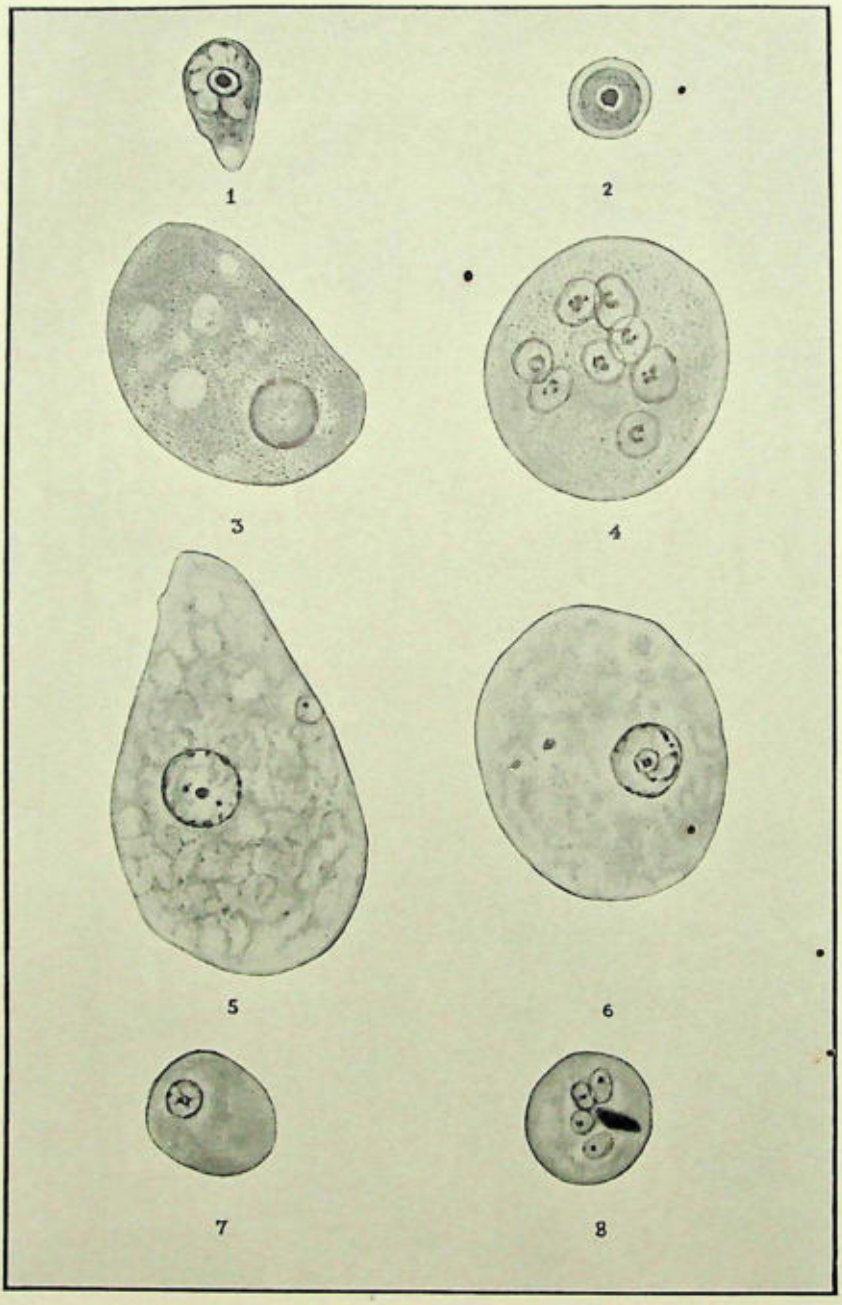
FIG. 4.—Encysted form of *Entamoeba coli*, from the stool of a healthy person. Note the large size, the relatively thick cyst wall, the 8 ring-form nuclei, and the absence of "chromidial bodies."

FIG. 5.—Motile form of *Entamoeba histolytica*, from the stool of an acute case of entamoebic dysentery. Note the reticulated structure of the cytoplasm and the scanty chromatin in the ring-form nucleus.

FIG. 6.—The "*tetragena*" type of motile *Entamoeba histolytica*, from a chronic case of entamoebic dysentery. Note the structure of the nucleus. It contain a heavier peripheral ring of chromatin —a part of which is detached from the nuclear membrane—than in the typical *histolytica*; and there is a central karyosome, consisting of a central granule surrounded by a circle of chromatin granules.

FIG. 7.—The precncysted stage of *Entamoeba histolytica*, from a "carrier" case. Note the small size, dense cytoplasm, and heavy peripheral ring of chromatin in the nucleus, which causes it to resemble a small *Entamoeba coli*.

FIG. 8.—Encysted form of *Entamoeba histolytica*, from a convalescent case of entamoebic dysentery. Note the small size, the cyst wall, the 4 ring-form nuclei, and the "chromidial body."



Typical Examples of Amoeba and Entamoeba.

8. No cases of dysentery have developed in men who ingested *Entamœba histolytica* from an acute case of entamœbic dysentery, from the liver abscess, nor in the 2 men who ingested *Entamœba histolytica*, but who did not become parasitized with the entamœbæ.

9. All of the experimental dysenteries have been obtained after ingesting *Entamœba histolytica* from normal stools of "carriers." In 2 of the cases the infection was from "contact carriers" who had not, and have not subsequently, developed dysentery, and in one of the latter cases 371 days, and the passage through 2 "contact carriers" intervened between the case of natural and the case of experimental entamœbic dysentery.

10. No cases of spontaneous entamœbic dysentery have occurred in this ward during the period of these experiments.

11. In consequence of the results obtained in these experimental infections of men with *Entamœba histolytica*, the following conclusions appear warranted :—

(*a*) *Entamœba histolytica*, like *Entamœba coli* and in contrast to the *Amœbæ*, is a strict or obligatory parasite and cannot be cultivated on Musgrave and Clegg's medium.

(*b*) "*Entamœba tetragena*," Viereck is identical with *Entamœba histolytica*, Schaudinn, and "*tetragena*" cysts are developed in the life cycle of *Entamœba histolytica*.

(*c*) The large percentage of latent infections obtained in these experiments is wholly consistent with our clinical and pathological experience with entamœbic dysentery.

(*d*.) *Entamœba histolytica* is the essential etiologic factor in endemic tropical dysentery.

D. Information believed to be of the greatest value for the diagnosis, treatment, and prophylaxis of entamœbic dysentery has been obtained in this experimental investigation.

1. Since it has been determined that *Entamœba histolytica* is the specific etiologic agent, it will be possible to make an accurate laboratory diagnosis of entamœbic dysentery.

2. The distinction between the pathogenic *Entamœba histolytica* and the harmless *Entamœba coli* having been established, there will no longer exist an excuse for the indiscriminate treatment of all persons who show entamœbæ in their stools.

3. The relatively long incubation period of this disease and the ability to diagnose latent infections make it possible to anticipate with treatment an attack of entamœbic dysentery.

4. Since there is evidence that ipecac. treatment, which is very efficient in relieving attacks of entamœbic dysentery and causing the entamœbæ to disappear temporarily from the stools, does not always kill all of the entamœbæ in the intestine, treatment should always be controlled by stool examinations for *Entamœba histolytica*. By this precaution, relapses, so common in entamœbic dysentery, can be forestalled.

5. The following data have been acquired upon which to base a rational prophylaxis of entamœbic dysentery :—

(*a*) *Entamœba histolytica* is the essential etiologic agent in the disease.

(*b*) The specific entamœba is an obligatory parasite, and cannot propagate outside of the body of its host.

(*c*) The motile forms of this entamœba, which are passed in the bloody mucous stools in acute dysentery, quickly die and disintegrate, and are probably, under natural conditions, incapable of withstanding passage through the human stomach.

(*d*) In consequence of the relatively long incubation period of entamœbic dysentery, the prevalence of chronic and latent infections, and the frequent failure of treatment to kill all of the entamœbæ in the intestine, "carriers" of *Entamœba histolytica* are common in endemic regions.

(*e*) These "carriers" are constantly passing in their stools large numbers of the resistant, encysted stage of *Entamœba histolytica*.

6. These facts make it probable that "carriers" of *Entamœba histolytica* constitute the chief, if not the sole, agents in the dissemination of entamœbic dysentery.

7. Prophylactic measures should, therefore, be directed towards "carriers" of *Entamœba histolytica*, and should include the following:—

(*a*) The identification of "carriers" of *Entamœba histolytica* by the microscopic examination of the stools of convalescents, household servants, and other suspects or persons whose employment or associations make them particularly dangerous to the public health.

(*b*) The sanitary disposal of fæces.

(*c*) The treatment, controlled by microscopic examination of their stools, of all "carriers" of *Entamœba histolytica*.

8. Since the incubation period of entamœbic dysentery is usually long, and latent infections are common, the most efficient personal prophylactic measure is frequent stool examinations, as an index for treatment, of all persons residing in endemic regions."

S. R. Douglas.

Douglas (S. R.). **Notes on Amœbic Dysentery from Papers published during the past year.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1282-1283.

A paper opening a discussion upon dysentery. At the present time many observers—for example Darling and Wenyon—believe that Schaudinn's description of the life history of the amœba causing dysentery is erroneous, and that the true life history of this organism is that described by Viereck. It is now supposed that *Entamœba histolytica* is the same as *E. tetragena*. As the author says, the situation has been admirably summed up by Fantham [see this *Bulletin*, Vol. 2, p. 166.]

With regard to the cultivation of the pathogenic amœbae, practically all observers are agreed that these protozoa have never been grown on artificial media, those cultures which have been obtained being of non-pathogenic varieties and frequently air-borne.

Reference is also made to cases of amœbic dysentery having occurred in patients who had never left France. Such cases, though rare, have also occurred from time to time in Germany and the British Isles. Rarer complications of the disease such as brain abscess and phagedenic ulceration of the skin are also described.

The paper terminates with the question of treatment. Due prominence is given to Vedder's important researches which led to the adoption by Rogers of emetine in the treatment of the disease. In the past this drug had been given frequently as a substitute for ipecacuanha, with markedly good results, but had apparently passed from the ken of medicine again. Whether the emetine treatment is a radical one, as is claimed by Rogers, can only be solved, the author thinks, by time and further careful experiments on animals.

G. C. Low.

Bourret. **Recherches sur le Parasitisme intestinal, la Dysenterie et la Maladie du Sommeil à Saint-Louis, Sénégal.**—*Ann. d'Hyg. et Méd. Colon.* 1913. Apr.-May-June. Vol. 16. No. 2. pp. 283-307.

The authors examined the stools of 52 patients suffering from various diseases other than dysentery, and found Entamœba only in

two cases. They were unable to identify to what variety these Entamoebae belonged.

In 33 cases of dysentery (20 Europeans and 13 natives), examination of stools revealed the presence of Entamoebae in every case; the commonest variety was the *Entamoeba tetragena*. Attempts to obtain cultures of the *E. tetragena* were always unsuccessful, although *Amoeba limax* was frequently cultivated.

A few animal experiments were attempted, in most cases with negative results; the only successful propagation of the disease occurring when young cats were used.

The following parasites were found associated with the *E. tetragena* in various cases :—

Lamblia intestinalis	..	on 5	occasions.
Undetermined flagellates	..	„ 2	„
Trichocephalus [*Trichuris*] *trichiurus*		„ 1	„
Necator americanus	..	„ 2	„
Blastocystis enterocola	..	„ 2	„

One case of what the author describes as " dysenterie bilharzienne " is referred to.

S. R. D.

MORIYASU. **The Amoebic Dysentery in Korea and its Blood Changes.**—*Sei-I-Kwai Med. Jl.* 1913. Sept. 10. Vol. 32. No. 9. (Whole No. 379). p. 115. (The original in No. 2, Vol. 1 of the *Jl. of the Japanese Med. Soc.* Nippon. Naikwa-gakkwai).

This is an abstract of a paper by the author in which he studies 16 cases of amoebic dysentery, and forms the following conclusions :—

1. From his experience in Korea he finds only the *Entamoeba histolytica* and never the *E. tetragena* in the fæces of cases of amoebic dysentery.
2. In 5 of these cases (33·5 per cent.) hepatic abscesses occurred, pus from which in some cases showed the pathogenic amoebae, but never bacteria.
3 The blood of patients with amoebic dysentery shows leucocytosis, and especially an increase in the polymorpho-nuclear neutrophiles. The eosinophile cells diminish as the disease progresses, finally disappearing from the blood before death.
4. The same blood changes occur in bacillary dysentery.

S. R. D.

BRAU (P.). **Amibiase intestinale.—Diarrhée noire.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. No. 8. pp. 567-569.

The author records cases of diarrhœa, in which the stools are of an ink black colour, due to entamoebae. These stools when examined microscopically generally show active entamoebae, but in some case cysts predominate. The former type of case rapidly recovers when treated with emetine subcutaneously, but the latter type is much resistant to treatment, so that it has been the author's practice to encourage by injudicious diet the conversion of these cysts into active amoebae, and then to treat the exacerbated symptoms with emetine, which effects a seemingly permanent cure.

S. R. D.

PHILLIPS (Llewellyn). **Amoebiasis. (1) Cerebral Abscess secondary to Amoebic Abscess of the Liver. (2) The Treatment of Liver Abscess discharging through the Lung.**—*St. Bart.'s Hospital Jl.*, 1913. July. Vol. 20. No. 10. pp. 158–159.

This paper consists of the report of three cases. The first is one of cerebral abscess following an amoebic liver abscess, and occurred in a European who contracted dysentery in 1912, in Egypt. He returned to England on sick leave and there developed a liver abscess which was successfully operated on, with the result that the general health improved, but was not altogether satisfactory.

On his return journey to Egypt he was taken ill, and suffered from headache situated in the occipital region. On his arrival in Cairo, he at once went into hospital; his temperature was 97° F. on admission, and rose to 101° F. the same day, pulse 60. The next day temperature was 101° F. in the morning, falling to 97° F. in the evening, pulse 56; Kernig's sign and tache cérébrale were present; there was some disturbance of vision, and during the whole of this period he complained of violent headache in the occipital region.

A lumbar puncture was performed and straw-coloured clear fluid was obtained, which on cultivation appeared to be sterile. He became delirious the same evening and died the next morning. Post mortem examination of the brain showed a small cavity in the left occipital lobe, containing about two drachms of semi-purulent fluid. The abscess cavity had no definite lining membrane. Unfortunately no microscopical examination of the pus or the abscess wall was made.

The other two cases are both of liver abscess which discharged through the lung; in one the treatment employed was the administration of ipecacuanha by the mouth; in the other emetine hydrochloride was given hypodermically. Rapid recovery, seemingly permanent, took place in both cases.

S. R. D.

LEGRAND (Hermann). **Abcès amibien du Cerveau opéré chez un Malade ayant presénté plusiers Rechutes de Dysenterie et Deux Abcès du Foie successivement opéré et guéris. Mort, Autopsie, Histologie et Cultures bactériologiques.** (Rapport de M. JACOB.)—*Bulls. et Mems. Soc. de Chirurgie de Paris.* 1913. Nov. 18. Vol. 39. No. 34. pp. 1435-1442.

The case was first admitted into hospital with a liver abscess, which was successfully located, opened and drained; recovery was rapid. Two months later another liver abscess formed and was again successfully treated, the patient returning home, and even working.

Five weeks later the patient returned to hospital, having had fever for a week, with violent headache, most marked over the right side. Within two or three days the condition became much worse, with slow pulse, stupor and paresis of the left side of the face and left arm, and this paresis increased and affected the left leg. A cerebral abscess was diagnosed and an operation performed, but no abscess could be discovered, and the patient died without recovering consciousness. The post mortem examination revealed an abscess in the right temporal lobe and no other active dysenteric lesion, the liver being normal, and the scars of the former operation very slight.

An examination of the fluid from the cerebral abscess showed no amoebae, but sections made from a portion of the abscess wall revealed them in large number. Cultures of the contents of the abscess made on serum media and incubated under anaerobic conditions, grew some very small colonies which on microscopical examination proved to be a minute coccus, which would only stain with carbol fuchsin. A similar organizm had been isolated from the contents of the first liver abscess. No growth took place under aerobic conditions.

S. R. D.

Sitsen (A. E.). **Merkwaardige Complicaties bij Amoeben-Dysenterie.** [Remarkable Complications of Amœbic Dysentery.]—*Geneesk. Tijdschrift v. Nederl.-Indie.* 1913. Vol. 53. No. 5. pp. 700-716. With 1 text fig.

An account of two fatal cases of dysentery with post mortem examinations. In the first case death was due to thrombosis of the portal vein. In the second there was an abscess in the liver, leading to thrombosis of the vena cava and pulmonary artery. Death was immediately due to an abscess in the brain. In connection with the first case, the author discusses the question whether liver-abscess is due to conveyance of amoebae by the portal vein, or whether, in the first instance, they are conveyed by the lymphatics, whose enlargement causes thrombosis in the vein.

S. R. D.

Lesk (Robert). **Ueber seltenere Komplikationen der Amoebendysenterie. (Peritonitis e perforatione ulceris dysenterici coeci. Abscessus perityphliticus dysentericus, Parotitis, Strictura recti, Incarceratio interna.)** [On the rarer Complications of Amœbic Dysentery.]—*Geneesk. Tijdschrift v. Nederl.-Indie.* 1913. Vol. 53. No. 5. pp. 639-655. With 1 plate and 1 chart.

An uninteresting essay on all the possible complications of dysentery, based mainly on other persons' experience. There is a plentiful quotation of authorities. It, of course, sometimes happens in the course of a chronic disorder, like amoebic dysentery, that perforations of the bowel occur, or that sub-peritoneal abscesses develop, due to secondary infections. These the author thinks necessary to commemorate at length. In the title he makes mention of parotitis as a possible complication of amoebic dysentery, a thing which it would be interesting to know something of. On turning to the case, however, we find it to be one of a boy who came under treatment for double suppurative parotitis, and gave a vague history in addition of having had dysentery some months before. The glands were incised, and pus was let out, but it contained no amoebae. Quite probably the parotitis had nothing whatever to do with the dysentery. This it a fair sample of the author's acumen, and the way in which he makes up his paper.

S. R. D.

CANTLIE (James). **Hepatic Abscesses which open upwards through the Lung.**—*Jl. Trop. Med. & Hyg.* 1913. Nov. 15. Vol. 16. No. 22. pp. 345-347. With 2 text figs.

After touching on the difficulty of diagnosis of liver abscess, the author urges the necessity of early operation, and deprecates the continuation of treatment by ipecacuanha or emetine for too long a period, in the hope of bringing about the absorption of the pus. He points out the importance of perihepatitis as a sign that pus has formed, and the presence of a dry cough as an indication that the pus is tracking upwards. He describes the further signs and symptoms till the pus is coughed up, and states that although this causes temporary relief, relapses are frequent and may recur indefinitely.

The paths the pus takes in reaching the chest are then discussed, and may be summed up as follows :—

1. Infiltration and soddening of the whole base of the lung with a small opening into one of the smaller bronchi.
2. Tracking upwards towards the root of the lung in the cellular tissue of the mediastinum between the pericardium and the reflection of the pleura ; the abscess ulcerates into a large bronchus.
3. After passing through the diaphragm the abscess opens into the pleura and causes a localized empyema ; or,
4. Tracks along between the diaphragm and pleura, and points in an intercostal space.

The description is then given of an operation which the author performed for an abscess which had tracked up the mediastinum.

S. R. D.

CAZAMIAN.—**Abcès du Foie opéré, ouvert secondairement dans l'Estomac. Vaste Ulcère par Autodigestion de la Paroi. Mort.**—*Arch. de Méd. et Pharm. Navales.* 1913. Aug. Vol. 100. No. 8. pp. 138–150.

An account of a case of abscess of liver in a chronic dysenteric.

The abscess was opened and drained, and the patient showed signs of improvement for about five days, when signs of peritonitis appeared ; these, however, gradually subsided, and there was again a period of improvement. Between 3 and 4 weeks after the operation, the temperature again became raised, and the drainage tube had to be reinserted into the wound ; this allowed the escape of some pent up pus. The discharge continued profuse, and contained blood and bile. The wound broke down and ulcerated, and examination of the discharge proved it to be gastric juice. The patient died 47 days after the operation. Post mortem, an enormous abscess cavity was found in the liver opening into the stomach by an aperature as large as the palm of a hand. The wound in the abdominal wall was ulcerated, the ulcer measuring 10 cm. in diameter.

S. R. D.

CORDIER. **Dysenterie et Hépatite suppurée.**—*Ann. d'Hyg. & Med. Colon.* 1913. April–May–June. Vol. 16. No. 2. pp. 444–466.

The account of a case of multiple abscess of liver consecutive to

dysentery. In spite of the fact that attempts were made, on two occasions, to discover the locality of the abscess by aspiration, no pus could be found, and the patient died. Post mortem: the liver was found to be crowded with small abscesses, the largest being about the size of a nut; the spleen was enlarged and contained five or six similar foci of suppuration. Microscopical examination revealed the presence of amoebae in the walls of these abscesses.

S. R. D.

Bond (Ashton). **An unusual Case of Tropical Liver Abscess.** Church Missionary Society Hospital, Toro, Uganda.—*Brit. Med. Jl.*, 1913. Dec. 13. pp. 1536-1537.

The report of a case of liver abscess, the points of interest being (1) the somewhat unusual situation, the abscess forming a well defined tumour situated in the epigastrium and (2) that the patient was a native of Tropical Africa. No history or signs of dysentery are reported.

The patient recovered rapidly after the abscess was opened.

S. R. D.

Heymann (P.). **De l'Examen Radiologique du Foie, sa Valeur dans les cas d'Abcès.**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1913. Oct. Vol. 4. No. 8. pp. 364-374. With 2 plates.

An account of four cases of liver abscess, showing the valuable help given by X-ray examinations, both for diagnosis and the result of treatment.

S. R. D.

i. Dopter. **Le Chlorhydrate d'Emétine dans le Traitement de l'Amibiase.**—*Bull. Acad. Méd. Paris.* 1913. Séance du 18 Nov. Vol. 70. (3 ser.). 77e Année. No. 36. pp. 442-444.

ii. Orticoni (A.). **La Dysenterie amibienne et le Chlorhydrate d'Emétine.**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 609-612.

iii. Bizard. **Sur l'Emploi de l'Emétine dans le Traitement de la Dysenterie amibienne et de l'Hépatite.** *Ibid.* Oct. No. 8. pp. 564-567.

iv. Baur (Jean) & Plisson (L.). **Grand Abcès du Foie d'Origine dysenterique traité par la Ponction évacuatrice et des Injections d'Emétine: Bulle gazeuse intrahépatique; Guérison.**—*Bulls. et Mémes. Soc. Méd. des Hôpit. de Paris.* Nov. 13. 33e Sér. Vol. 29. No. 32. pp. 478-498. With 4 figs.

v. Dopter (M.) & Pauron (M.). **Contribution a l'Étude de l'Action de l'Emétine dans le Traitement des Abcès dysentériques du Foie.** —*Ibid.* Dec. 4. No. 35. pp. 683-691.

vi. Tuffier. **Abcès du Foie traité par Emétine. (A propos du procès-verbal).**—*Bulls. et Mémes. Soc. Chirurgie de Paris.* 1913. Nov. 25. Vol. 39. No. 35. pp. 1454-1455.

vii. des Barres (Leroy). **Amibiase intestinale et Abcès du Foie. Traitement par l'Emétine et l'Ouverture de l'Abcès.** (Rapport de M. H. Morestin).—*Ibid.* Nov. 18. No. 34. pp. 1429-1435.

viii. Spittel (R. L.). **The Effects of Emetine on Abscess of the Liver.**—*Brit. Med. Jl.* 1913. Oct. 25. p. 1058.

ix. Field (F. E.). **Observations on Dysentery with special References to its Treatment by Hypodermic Injections of Emetine.**—*British Guiana Med. Annual for* 1912. pp. 1–7. With 2 tables.

x. Lyons (Randolph). **Emetine hydrochlorid in the Treatment of Amebic Dysentery.**—*New Orleans Med. & Surg. Jl.* 1913. Oct. Vol. 66. No. 4. pp. 278–282.

xi. Cloud (R. E.). **A Case of Amebic Dysentery treated with Emetin hydrochlorid.**—*Jl. Amer. Med. Assoc.* 1913. Nov. 22. Vol. 61. No. 21. p. 1899.

xii. Dessy (S.) & Marotta (R. A.). **Contribución al Tratamiento de la Enteritis Disenterica y del Absceso del Higado (Amibiano) con el Método de Rogers.** —*Semana Medica.* 1913. May 15. Vol. 20. No. 20. pp. 1136–1141.

xiii. Carini (A.). **O Chlorhydrato de Emetina no Tratamento da Dysenteria e da Hepatite Amebianas.**—*Annaes Paulistas de Med. e Cirurgia.* 1913. Oct. Vol. 1. No. 3. pp. 75–81.

i. The author, having treated five cases of liver abscess and 46 of amœbic dysentery with injections of emetine hydrochloride, sums up the efficacy of this treatment as follows :—

1. Emetine only acts on the lesions caused directly by the amœbae.
2. Although treatment with emetine quickly causes an amelioration of the symptoms of amœbic dysentery, such treatment is no guarantee against relapses.
3. Although the case is apparently cured, liver abscess may occur.
4. Although emetine possesses an undoubted amœbicidal action for the motile amœbae, the cystic stages are quite unaffected by its action.

ii. The report of a case of chronic dysentery of one year's duration. Examination of the stools showed amœbae in large numbers. Four to sixteen centigrams of emetine hydrochloride were administered daily, in all 74 cgm., with the result that the amœbae disappeared from the stools. About 3 weeks later amœbae were again present in the stools, and emetine was again administered, 4 cgm. being given daily, in all 20 cgm. Even then amœbae were still present, although the patient's general condition had improved greatly, practically all symptoms of dysentery being lost. Further emetine injections were advised, but the patient refused treatment.

iii. The record of five cases successfully treated with emetine. The only point of interest is, in the case of an infant aged 23 months, the administration of emetine per rectum, 1·5 cgm. of the hydrochloride being dissolved in 100 cc. of salt solution. Three such enemata were given and the case rapidly recovered.

iv. A very long and complete account of a case of liver abscess. The special points of interest are :—The large size of the abscess, two and a-half litres. After aspiration and injection of emetine solution into the abscess cavity, air was found by means of skiagrams to be present in the cavity. Six aspirations were necessary before the abscess

formation ceased. Emetine was given hypodermically. No amœbae were found either in the stools or in the liver pus.

The rectal injection of the pus from one of the later aspirations failed to produce dysentery in a kitten.

v. An account of two cases of liver abscess treated with emetine; there was marked amelioration of symptoms, but after a short time the condition became stationary. Rapid and seemingly complete recovery, however, took place after operation in the one case, and evacuation of the pus *per os* in the other.

vi. The account of a case of liver abscess following dysentery contracted in Morocco. While the patient was in hospital the abscess burst into the lung. Emetine in 4 centigram doses was administered for five days in succession with marked general improvement; ten days later, however, the symptoms returned, but quickly disappeared on continuation of the emetine treatment. At the time of writing the patient was practically well.

vii. The history of a case of amœbic infection, who when first observed had no dysentery or diarrhœa, and whose only symptoms were malaise and abdominal pain located principally in the right iliac fossa. An examination of the stools, which were quite normal to the naked eye, showed many amœbae, and in consequence, emetine hydrochloride was administered, 3 doses each of 4 centigrams being given. A further examination of the stools failed to reveal any active amœbae, but cysts were present in large numbers, and the patient's general condition improved. Within a few days, however, tenderness over the liver region was noticed, and the temperature rose, and these symptoms failing to disappear under treatment with emetine, the liver was explored by puncture, and an abscess was located and opened. The patient then quickly recovered.

viii. The report of a case of amœbic abscess of the liver which was treated by incision and hypodermic injections of emetine hydrochloride.

Six days after the operation, owing to the removal and replacement of the drainage tubes, pus escaped into the general peritoneal cavity, and the patient died 3 days later. The post mortem examination showed a cavity of a capacity of only 4 oz., although at the time of the operation 1½ pints of pus were evacuated. Sections of the abscess wall showed rapid fibrotic changes.

ix. The author devotes the whole of his paper, except a few notes on the history and methods of the diagnosis of amœbic dysentery, to the treatment of the disease by hypodermic injections of emetine. A table is given showing the very satisfactory results thus obtained in 42 cases.

x. The account of 7 cases of amœbic dysentery treated with subcutaneous injections of emetine hydrochloride.

All the cases recovered rapidly, with one exception, who had peritonitis when admitted into hospital, and was found at the post-mortem examination to have gangrene of the large intestine, with three perforations. The doses of emetine hydrochloride given were from half to three-quarters of a grain per diem.

xi. The report of a case of chronic dysentery of 3½ or 4 years' duration. Microscopical examination of the stools showed abundant

amoebic. Emetine hydrochloride, ½ to 1½ gr., was given daily, in all 4 grains. Recovery was rapid and seemingly complete.

xii. A continuation of the authors' previous paper which was abstracted in this *Bulletin*, Vol. 2, p. 164. Four more cases of amoebic dysentery are related, in one of which an abscess of the liver had opened into the right lung two days before admission into hospital. The patient was expectorating pus in which amoebae were detected. In spite of this complication, treatment by ROGERS's method was brilliantly successful. Five injections of chlorhydrate of emetin were given on successive days, beginning with a dose of 2 cgm. which was increased to 4 cgm. for the last two injections, the total quantity used being 14 cgm. These doses were tolerated perfectly. In a week from the last injection all expectoration of pus had ceased, and the patient was convalescent. No other treatment was employed.

xiii. Six cases of amoebic dysentery and liver abscess treated with emetine with uniform success. The author is loud in his praises of the new remedy, which he thinks will prove an inestimable boon to practitioners in Brazil. The cases related are of an ordinary type and do not call for notice.

S. R. D.

NEUBERT. **Ueber die Wirkung von Uzara und geronnener Milch bei Darmerkrankungen.** [On the Action of Uzara and Sour Milk in Bowel Complaints.]—*Arch. f. Schiffs-u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 840–842.

An account of a case of amoebic dysentery treated with Uzara, a proprietary preparation recommended by WALDOW (this *Bulletin*, Vol. 1, p. 712), followed up by de-emetinized ipecacuanha, the patient being kept the while on a diet of sour milk. As the supply of Uzara gave out at the end of 10 days, before the patient was finally cured, the result is not as conclusive as could be desired. A few remarks are added on the benefit of sour milk in such cases, as a substitute for the usual gruel.

S. R. D.

CRAIG (Charles F.). **The Classification of Amoeba, with Special Reference to the Parasitic Species.**—*Amer. Jl. Trop. Diseases & Preventive Med.* 1913. Nov. Vol. 1. No. 5. pp. 351-361.

In this paper the author sets forth a classification of amoebae, "essentially that of Prof. CALKINS," and gives useful lists of genera and species.

"CALKINS divides the old genus *Amoeba* into seven genera, as follows:—*Amoeba*, *Vahlkampfia*, *Nagleria*, *Paramoeba*, *Craigia*, *Trimastigamoeba* and *Entamoeba*."

1. The genus *Amoeba*, Bory, 1822, "is characterized by large amoeboid organisms, having one or more nuclei and contractile vacuoles, the nucleus containing a large karyosome or scattered granules of chromatin. The ectoplasm and endoplasm usually distinct. Reproduction by division or sporulation." All the species are free living.

2. Genus *Vahlkampfia*, Chatton, 1912. "This genus contains amoebae characterized by the presence of one or more nuclei, dividing by simple division or a very primitive form of mitosis, and encysting to form a uninucleate cyst. A contractile vacuole is almost invariably present, and sometimes more than one. The nucleus contains a very large karyosome, which sometimes shows a distinct centriole. Habitat, water and earth. Have been observed as parasites." Small amoebae, originally classed in the genus *Amoeba* under the so-called *limax* type, most of them free living. Can be cultivated on artificial media. "No evidence demonstrating that they are pathogenic." "They may be easily distinguished from the true parasitic amoebae by the large nuclear karyosome, the uninucleate cyst, and the presence of at least one contractile vacuole."

3. Genus *Nagleria*, Alexeieff, 1912, emend. CALKINS, 1913. "In this genus CALKINS names one species, *Nagleria punctata* Dangeard, characterized by a nucleus containing a distinct karyosome, and two flagella situated at the anterior end of the body and equal in length to the body cell. Encystment occurs, the cyst being uninucleate. The species lives in pond water."

4. Genus *Paramoeba*, Schaudinn, 1896. "Characterized by an accessory body to the nucleus and a flagellated stage of existence." One species only, *P. eilhardi*, possessing two flagella, and found in a marine aquarium.

5. Genus *Craigia*, Calkins, 1912. The type species, *C. hominis*, is "characterized by a nucleus, an accessory nuclear body, and by an amoeboid and flagellate stage of development. In the amoeboid stage multiplication occurs by simple division, and by the formation of cysts containing numerous flagellated organisms. In the flagellate stage of development multiplication occurs by longitudinal division, preceded by division of the accessory body and nucleus. This parasite has been found only in the human intestine, and it is believed to give rise to a severe form of chronic diarrhoea." *C. hominis* was called by Craig (1906) *Paramoeba hominis*, but it has only one flagellum.

6. Genus *Trimastigamoeba*, Whitmore, 1911. The type species, *T. philippinensis*, is "characterized by a nucleus of the *limax* type, a contractile vacuole, and the occurrence, under certain conditions, of flagellate forms having three equal flagella. The species can be easily cultivated upon suitable media." It was first obtained from tap water in Manila.

7. Genus *Entamoeba*, Leidy, 1879. "The generic characters are as follows:—Size comparatively small, from 5 to 80 microns; ectoplasm and endoplasm distinct when the parasites are moving, and often when motionless; a contractile vacuole generally absent; nucleus with a definite karyosome and centriole; nuclear division mesomitotic and mitotic; reproduction by simple division, schizogony, or cyst formation, with the production of several daughter amoebae in the cyst. Habitat, the body of man or other animals, generally in the digestive tract. The genus contains only parasitic species, some of which are pathogenic, but most living merely as commensals in the intestines of their host. None of the species have been cultivated." A long list of species is given.

H. B. Fantham.

KUENEN (W. A.) & SWELLENGREBEL (N. H.). **Die Entamöben des Menschen und ihre praktische Bedeutung.**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Nov. 15. Vol. 71. Nos. 5-7. pp. 378-410. With 2 plates & 15 text figs.

The authors give an account of the amoebae they encountered in hospital patients in Medan (Deli-Sumatra). They describe the variations of *Entamoeba coli*, some of which have been considered separate entities, e.g., *E. williamsi*, and then give an account of the development of *Entamoeba tetragena*, which is the specific dysentery amoeba of Sumatra. *E. tetragena* is considered to have three phases of development :—(1) as a tissue parasite, which the authors term the "histolytica phase;" (2) as an inhabitant of the gut lumen, the "minuta stage"; and (3) the cyst stage. Cytological details of each form are given. Details of cases in which the "histolytica form" was replaced by the "minuta form," and that by cysts, are given, together with some of the variations in the structure of amoebae found in stools.

The diagnosis of amoebiasis is described :—(a) by searching of blood-stained mucus, when erythrocytes ingested by the amoebae are a useful guide; (b) by examination of evacuations. Amoebae and cysts are then found. Confusion of the amoebic cysts with those of Trichomonas and Lamblia must be avoided. Cysts of *E. coli* and *E. tetragena* are differentiated, *E. coli* being distinguished by its double contoured cysts, its 8 nuclei, and its glycogen reaction with iodine. The difference in diameter and percentage of cysts having such diameters differentiates the quadrinucleate, mature *E. tetragena* from the immature 4-nucleate stage of *E. coli*. A chart illustrates this. Cyst stages are generally associated with "minuta" forms.

The resistance of amoebae and cysts to re-agents is considered. Sublimate, 1 per 1,000, kills cysts in 4 hours; creolin, 1 in 250 kills in 5-10 minutes; 50% alcohol, boiling water and Schaudinn's sublimate-alcohol kill at once. 10% formalin, acting only for a few minutes, does not kill the cysts. Cysts are less resistant on drying. This makes it unlikely that flies act as transmitters. Emetin acts differently on cysts and amoebae. The "histolytica" forms from fresh faeces mixed with emetin solution of 1 in 10,000 die in a few minutes, as ROGERS described. "Minuta" forms are much more resistant, an emetin solution of 1 in 5,000 giving some live amoebae after 48 hours. Cysts are extremely resistant, and some were not killed even with a concentration of 1 in 100 emetin acting for half an hour.

The two plates illustrate the morphology of *E. coli* and *E. tetragena*.

H. B. F.

i. WHITMORE (Eugene R.). **Free-living and Parasitic Amoebae and their Relation to Dysentery.** *Amer. Jl. Trop. Dis. & Preventive Med.* 1913. Sept. Vol. 1. No. 3. pp. 197-219. With 1 plate.

ii. WENYON (C. M.). **The Morphology of the Intestinal Amoebae of Man.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1287-1288.

These papers are reviews of our knowledge of the various entamoebae of man, and their relation to dysentery. They traverse ground familiar to those who have been following the abstracts of literature relating to amoebic dysentery in this *Bulletin*.

i. Whitmore's article is perhaps the more dogmatic. After an historical introduction, he discusses "the nucleus of vegetation forms" of *E. coli*, *E. histolytica* and *E. tetragena* on which he lays some stress, then chromidia formation and encystment. Lastly, some attention is given to pathogenicity and culturability. The author considers that to-day we are concerned with two intestinal amoebae in man, *E. coli*, a harmless commensal, and *E. tetragena* which is pathogenic. In conclusion Whitmore writes: "while expressing my belief that the parasitic amoebae have not been cultivated, I desire it to be distinctly understood that I am not an opponent of the attempts to cultivate the entamoebae, and I fully expect that they will be cultivated."

ii. Wenyon gives useful descriptions, based mainly on personal experience of *E. coli* and *E. histolytica* (including *E. tetragena*). Regarding the nucleus of entamoebae, Wenyon very wisely writes: "it seems to me that such a test as the distinctness or indistinctness of a nucleus as a guide to a differentiation of the entamoebae is quite inadequate. Not only is the nucleus of the entamoeba subject to wide variations, but the cytoplasm is equally variable." Wenyon regards *E. undulans* (Castellani) as a degenerate *Trichomonas*.

H. B. F.

AKASHI (M.). i. **Studien über die Morphologie und Entwicklung der *Entamoeba coli* Lösch emendata Schaudinn in Japan.**—*Beihefte z. Arch. f. Schiffs- u. Tropenhyg.* 1913. Nov. Vol. 17. Beiheft 8 pp. 5-18 [461-474.] With 2 plates.

ii. **Studien über die Ruhramöben in Japan und Nordchina.**—*Ibid.* pp. 19-43 [475-499]. With 2 plates.

i. The author describes *Entamoeba coli* as observed in the alimentary canals of Japanese. He states that during the vegetative phase of its existence *E. coli* differs greatly from *E. tetragena*, Viereck, the causative agent of dysentery among the natives of East Asia. Differences are shown in habits, movements and structure. The smaller 4-nucleate cyst of *E. tetragena* differentiates it from the 8-nucleate cyst of *E. coli*.

[The chief interest of the paper consists in the fact that it shows the uniformity of type of intestinal amoebae in Japanese dysentery with that found in other parts of the world.]

ii. The author gives an account of the amoebae found in cases of dysentery in N. China and Japan, prefacing his remarks by a slight historical sketch of the views of certain of the workers on dysentery. He considers that amoebic dysentery in Japan and N. China is due to one amoeba only, which he terms *E. tetragena*, Viereck. He recognizes two forms of trophozoites, large and small, the former occurring chiefly in blood-stained mucus of stools where it is active, has many vacuoles and contains many erythrocytes. The cytology of the nucleus is described, agreeing with the former accounts, as do also the remarks on cyst formation and structure. The cyclic period from the large trophozoite stage to the first encystment remains unknown. Cyst formation has never been seen in tissues.

The author devotes a section to the degeneration phenomena of Entamoebae as described by HARTMANN, and to *Entamoeba nipponica*,

Koidzumi. He considers that *Entamœba nipponica* is not an entity, but is a mistaken interpretation of shed cells from the body, basing his arguments on differences of morphology and nuclear structure, the occurrence of such structures in stools from various diseases that are not dysenteric, and the fact that he has not observed movement of these structures. A differential diagnosis of *E. tetragena* concludes the paper.

The two plates illustrate stages of *E. tetragena*, the degeneration forms of HARTMANN, and degenerating body cells from stools, which the author considers to be *E. nipponica*, Koidzumi.

H. B. F.

GAUDUCHEAU (A.). **Sur l'État Parasitaire et le Rôle Pathogène d'une Petite Amibe.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 560-564.

The author has observed small cells, 8μ in diameter, in certain pathological fæcal matter in Hanoi and Canton. When fixed and stained the cells are seen to possess a nucleus containing a karyosome and a well-marked nuclear membrane. The cells directly observed in the human intestine are like the cultural amœbæ described by the author in 1907 under the name *Entamœba phagocytoides*. The author found these amœbæ also in water. He observed that the adaptation of the water amœbæ to culture media was rapid, whilst the intestinal amœbæ took several months to adapt themselves. The cultures must be made "according to strict bacteriological technique," and not in Petri dishes exposed to the air. The amœba varies in its properties. In external media and in old cultures it is only slightly pathogenic and easily cultivated, while in the intestine and in freshly isolated cultures it is pathogenic and not easily cultivated. The author thinks that there is a flagellate stage in the life-cycle of amœbæ, and that they are polymorphic, there being intermediate forms between *tetragena* and *phagocytoides*. He believes that the small amœbæ (*phagocytoides*) are strict parasites of the human intestine, and considers that the life-cycles proposed for human entamœbæ "have been arbitrarily closed"; further, that in Indo-China, at any rate, pathogenicity must not be solely attributed to *E. tetragena* to the exclusion of *E. coli*.

H. B. F.

WHERRY (Wm. B.). **Studies on the Biology of an Amœba of the Limax Group.**—*Vahlkampfia.* sp. No. 1.—*Arch. f. Protistenkunde.* 1913. Sept. 25. Vol. 31. No. 1. pp. 77-94. With 2 plates & 8 text figures.

The amœba, *Vahlkampfia* sp., was isolated from the water supply of Oaklands, California, and was continued as a "pure-mixed" culture on Musgrave and Clegg's and other media. The trophozoites are capable of passing into a flagellate stage, when they have two flagella. The author states that in these amœbæ the size and number of nuclei and method of multiplication are dependent on the environment. He discusses the symbiotic bacillus and an associated spirillum.

The author gives a detailed description of the morphology of the organism, and extends the definition of the genus.

H. B. F.

WILLIAMS (Anna W.) & CALKINS (Gary N.). **Cultural Amebae. A Study in Variation**—*Jl. of Med. Research.* 1913. Oct. Vol. 29. (New Ser., Vol. 24). No. 1. (Whole No. 140). pp. 43-56. With 4 tables and 4 plates.

The authors commence by stating:—"Careful study of the life histories of various types of protozoa has fully demonstrated that fixity of type must be interpreted within wide limits. Variations in form and size may be due to stages in the life cycle or to varying conditions of the environment." "No species can be accurately defined until not only its full life history, but also its variations and modifications under various conditions of environment have been ascertained." "The failure to take into consideration the power of amebae to vary widely has led to a number of loose statements, usually in the form of generalization from incomplete or inadequate observations and experiments."

The principal strain of amoeba investigated was one received from MUSGRAVE* and now cultivated "pure, without other organisms," on brain tissue medium. "The variations shown by cultural amebae from the intestine when subject to experimental control, are sufficient to indicate that forms described as parasitic in the human intestinal tract may vary under differing conditions." "The type of nucleus, for example, varies from that of Vahlkampf's *limax*, through *E. tetragena* type to the type of *E. histolytica*. If specimens of this strain were found in faeces, with a large karyosome, and with but little peripheral chromatin or none at all, they might be described as "free living" forms belonging to the genus ameba. If other characteristic specimens from the same strain were found with a broad zone of chromatin forming the periphery of the nucleus and enclosing a karyosome, often in the form of a ring, with or without one to several granules within it, they might be described as *Entamoeba tetragena*. If still other characteristic specimens were found with small karyosomes and peripheral chromatin extending through an achromatic network from the karyosome to the nuclear membrane, they might be described as *Entamoeba coli* or as *E. histolytica*." "Nor do the cysts escape the variations. Much apparently depends upon them for the identification of 'parasitic' from 'cultural' amoebae, the cultural forms 'always' having one nucleus." A table is given which "shows that at 34° C. as many as 9½% of the total number of these "cultural" organisms may have two nuclei, and 1% may have four nuclei in the cysts, while at 38° C. 21% of all the amebae may have two nuclei, and more than 9% may have four nuclei in the cysts. If some of these tetra-nucleated cysts were found in faeces they might well be described as cysts of *E. tetragena*."

Too much stress is not laid on their experimental results by the authors, who state that "conditions of the cultures might be such as to bring about variations when these do not occur under conditions 'normal' to the organism. But it is not impossible that analogous variations occur with the forms described as pathogenic, and it is unwise for anyone at present to be too positive in regard to the

* A strain from the *same* stock was examined by CRAIG, and declared to be a "free-living" amoeba.

distinctive features of *Entamoeba coli*, *E. tetragena*, and *E. histolytica*, or any of the Entamoeba group."

The plates illustrate amoebae grown on "brain-tissue medium with a hemoglobinophilic bacillus." Some of the illustrations are microphotographs.

H. B. F.

COURET (Maurice) & WALKER (James). **The Cultivation of Amoebae in Pure Culture upon Autolyzed Tissues.**—*Jl. Exper. Med.* 1913. Sept. 1. Vol. 18. No. 3. pp. 252-258.

"The purpose of this paper is to record the cultivation of amoebae upon autolyzed tissue without bacterial association." Pieces of sterile liver, kidney, and brain of healthy rabbits, guinea pigs, kittens, and human placentae in sealed sterile flasks, were kept in a thermostat at 40°C. for 10 to 20 days. Neutral or slightly acid autolyzed tissue fluid has given the best results: the acidity should not exceed 1·5%. The fluid is used on agar slanted tubes, the tubes being kept horizontal till absorption has occurred. The medium is then sterilized. Melted agar mixed with tissue juice also serves, but "the surface of such slants should be broken before using." Addition of peptone is not necessary. An amoeba from liver abscess has been cultivated, using the above medium, but the authors "were unfortunate in that the material from this abscess proved not to be sterile, and for the present still leaves the problem in doubt." The authors believe, however, that there is "little doubt but that the symbiosis was between amoebae and tissue, and not between amoebae and bacteria."

"Five species of amoebae isolated by one of us (Couret) from the intestine in frank amoebic dysentery, and growing in symbiosis with bacteria, and a culture of amoeba with *Bacillus typhosus* from Musgrave and Clegg have been separated from their associated micro-organisms, and have now been growing for several generations on autolyzed tissue. . . . ."

"The separation of amoebae cultivated from the human intestine from their bacterial symbiont, and their development upon various autolyzed tissues indicate that it is not the bacterium that is essential for the life of these protozoa, but the action of the living bacteria upon the protein contained in the media. This would explain the failure of many investigators to cultivate amoebae with dead bacteria or bacterial filtrates. . . . ."

"Whether the amoebae cultivated from liver abscesses and from the intestinal canal upon diverse autolyzed tissues are able to produce lesions similar to those from which they were isolated, or whether they are non-pathogenic species which are accidental contaminators to those responsible for frank lesions, remains still to be determined."

H. B. F.

MATHIS (C.). **Entamibes des Singes.**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1913. Oct. Vol. 4. No. 8. pp. 388-410. With 4 plates.

The author gives a short historical resumé of the Entamoebae recorded from monkeys by various workers. He then describes the entamoebae which were very common among the monkeys of Tonkin, *Macacus rhesus* and *M. tcheliensis*. The observations were made on perfectly healthy monkeys. Two types of cysts were encountered: (1) cysts of the *coli* type with 8 nuclei; (2) cysts of the *histolytica*

(vel *tetragena*) type with 4 nuclei. The former is designated *Loschia legeri*, the latter, *L. duboscqi*. They are said to approach closely the *E. coli* and *E. histolytica* of man, particularly when encysted. The amoebae persisted for a long time in the intestine of the monkeys. At present experiments are in progress to determine whether these new entamoebae are pathogenic. The author points out that the presence of these entamoebae in the intestine of normal Macacus must not be overlooked when attempts are made to reproduce dysentery in these animals by means of human dejecta.

H. B. F.

Bacillary Dysentery.

Willmore (J. Graham) & Savage (A. Harold). **The Diagnosis and Treatment of Epidemic Bacillary Dysentery.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1283-1287.

This paper consists of an account of researches on dysentery amongst the pilgrims returning to Egypt, and is a continuation of the work published by Ruffer and Willmore in 1910.*

With regard to the agglutinating power of the patient's sera it was found that, using dilutions of one in twenty and one in forty, it was the exception rather than the rule to find only one type of dysentery bacilli agglutinated. The following table shows the results obtained with the sera of one hundred consecutive cases—four strains of bacilli were used :—

Table I.

Negative throughout	18
Shiga only	1
Flexner only	16
Tor only	10
87 up (lactose fermenter)	7
Shiga and Flexner	0
Shiga and Tor	6
Shiga and 87 up	2
Flexner and Tor	3
Flexner and 87 up	3
Tor and 87 up	6
Shiga, Flexner and Tor	6
Shiga, Tor and 87 up	4
Flexner, Tor and 87 up	5
Shiga, Tor, Flexner and 87 up	13
	100

Owing to the fact that agglutinins were absent in eighteen cases the routine practice for the diagnosis of bacillary dysentery was to plate out the stools of every case either on MacConkey's media or a special borated, lactose, cochineal agar (the exact composition of which is not given) and at the same time to test the serum against the four main types of dysentery bacilli. If a dysentery bacillus was isolated or a positive agglutination reaction for one or more bacilli was obtained, the case was considered to be one of bacillary dysentery, and this procedure the authors state to have given very good practical results although, as they note, it is open to theoretical criticism. The stools

* *Brit. Med. Jl.*, 1910. Nov. 12. pp. 1519-1522.

were also examined for entamoebae. In the following table the classification of cases according to their etiology, with figures for the previous years appended, shows the progressive diminution in the general mortality rate since the introduction of serum treatment.

TABLE II.

	1907.	1908.	1909.	1910.	1910–1911.	1911–1912.	1912–1913.
Total pilgrims	43,271	29,446	20,333	16,736	25,550	11,889	16,551
„ deaths	423	336	254	113	265	225	88
Per cent. mortality	1 (–)	1·14	1·25 (–)	0·67	1	1·9 (–)	0·53
Total dysentery admissions	—	155	212	138	328	199	75
Total dysentery deaths	—	82	134	45	71	139	9
Case per cent. mortality	—	53	63	32·6	21	(53) (70)	12
Total serum-treated cases	—	0	12	91	173	0	54
Deaths among serum cases	—	—	0	15	30	—	7
Case per cent. mortality	—	—	0	16·5	17·3	—	12·9
Cases in which Bacillary Infection only was Present.							
Number of serum-treated	—	—	12	72	111	—	22
Deaths among these	—	—	0	7	19	—	2
Case mortality per cent.	—	—	0	9·7	17·1	—	9
Number not serum-treated	—	—	196	2	76	—	4
Deaths among such	—	—	134	1	20	—	2
Case mortality per cent.	—	—	70 (–)	50	26·3	—	50
Total bacillary cases	—	—	208	74	187	—	26
Mixed Amoebic and Bacillary.							
Number serum-treated	—	—	0	19	62	—	32
Deaths among these	—	—	0	8	10	—	5
Case mortality per cent.	—	—	0	42·1	16·1	—	15·6
Number not serum-treated	—	—	4	4	28	—	8
Deaths among these	—	—	2	4	6	—	0
Case mortality per cent.	—	—	50	100	21·4	—	0
Total mixed infection	—	—	4	23	90	—	40
Amoebic.							
Number of Cases	—	—	—	41	51	—	4
Deaths	—	—	—	19	16	—	0
Case mortality per cent.	—	—	—	45 (–)	32	—	0
Perforation, general peritonitis, etc.	—	—	—	—	6	—	0
Per cent.	—	—	—	—	12	—	0
Dysentery death-rate (per cent.) compared with total death-rate	—	25	52·8	40	27 (–)	62 (–)	10·26

This serum treatment consisted of the injection of large doses, 80 to 120 cc. of multi-valent serum either intravenously or subcutaneously, repeated twice daily or at longer intervals as the patient's condition demanded. The emetine treatment was introduced during 1912–1913, and was administered to all cases showing amoebae in their stools.

A chart is given showing the dysentery mortality per cent. for the years 1908–13, and it is to be noted that during the years 1911–1912 no serum was available, and there was a marked rise in the mortality.

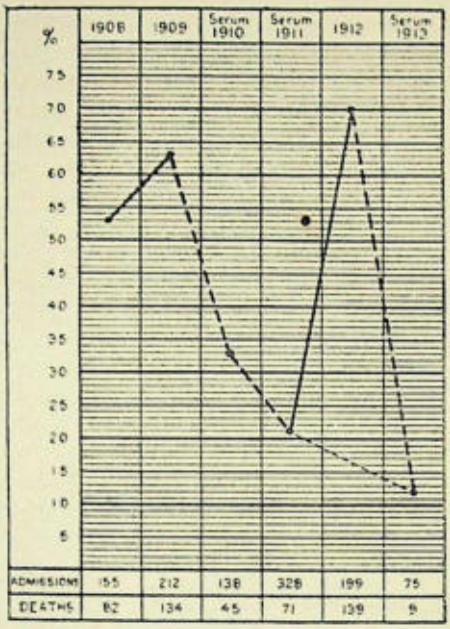


Chart showing dysentery mortality-rate per cent. for the years 1908—13.
(Reproduced, by permission, from the *British Medical Journal*).

The dark line of the curve indicates that no serum was used during that period; the broken line indicates that the bacillary cases were treated with serum.

Amongst other points discussed in this paper the authors state from the results of animal experiments that monovalent sera (prepared from Shiga's bacillus) were entirely wanting in any antitoxic value to other dysentery bacilli.

Another interesting observation was made with regard to the increase of albumin in the urine in patients suffering from nephritis who had received large doses of serum. It was at first thought that the treatment was causing an exacerbation of this condition, but investigation carried out with sera which had a precipitating action on horse or human showed that this increase of albumin was due to the excretion of the horse serum and not to an increase of the nephritis. The paper is concluded with some remarks on the general and dietetic treatment of the cases. S. R. D.

i. Brau. **Epidémie de Dysenterie Bacillaire observée à Saïgon en 1912.** —*Ann. d'Hyg. et Méd. Colon.* 1913. July.–Aug.–Sept. Vol. 16. No. 3. pp. 710-738.

ii. Huet. **Cas de Dysenterie observés en Juin 1912 à l'Hôpital de Saïgon.**—*Ibid.* pp. 739-741.

These papers give an account of an epidemic of bacillary dysentery

occurring at Saigon in June, 1912. Forty-six cases occurred among the artillery stationed there, and in thirty-three of these no amoebae could be found. The symptoms also were similar to those of bacillary dysentery, especially marked being the violent onset, presence of fever and the complete recovery in the non-fatal cases. Detailed accounts are given of twelve cases.

The bacteriological diagnosis, which forms the subject of the second paper, was positive in only three of the cases. From the stools of these was isolated a bacillus which the author believes to be *B. dysentericae* Shiga; its characters were: No production of indol; production of acid, positive in glucose and maltose broth, but negative in lactose, saccharose and mannite; non-motile. It was agglutinated by a Shiga serum (titre about one in three hundred) in a dilution of one in three hundred.

A few of the cases were treated with Dopter's serum in doses of 20 cc. with seeming benefit.

S. R. D.

GETTINGS (H. S.). **Dysentery Past and Present.**—*Jl. of Mental Science.* 1913. Oct. Vol. 59. No. 247. pp. 605-621.

This very interesting paper treats of bacillary dysentery of asylums. The author goes back to the time of the Middle Ages, when dysentery was a common disease of Europe, and shows how this ailment affected many events in history, and occurred in England in epidemic form even as late as 1849. He then traces the various outbreaks of this disease which have occurred in the Wakefield Asylum, and shows that since this institution was opened to patients in 1818, very few years have passed without cases of dysentery being recorded, and it has most probably been carried on from patient to patient ever since. The author concludes his paper by the following remarks:—

"This article is not brought forward merely as a historical recital, but because I believe the lessons it teaches are of value—as the lessons of history always are.

"For it shows that no amount of sanitation will stamp the disease out. It is no question of unsanitariness or of overcrowding, of the water supply, or of the other factors that have been proposed. They are only side issues, important in their way, but side issues all the same. It is the actual infection that matters; it is the chronic cases, the "carriers" who keep the asylum infection going, who originate fresh cases and epidemics. They form the keystone of the problem and must be detected and isolated before any permanent good can be done.

"It is with the infective person we must deal and not merely the aiding conditions. It is a difficult matter to detect them, I know, but it has to be done if the disease is to be eradicated. Much can be done by a strict segregation of all patients who have dysentery, or by routine examination of the stools. But the real hope lies in the laboratory, and I believe that if the problem were investigated it would not be long before the pathologist would be able to detect these carriers as to-day he detects the typhoid or the syphilitic. And if this could but be done, dysentery would soon be as much a thing of the past in our asylums as it is among the general population."

S. R. D.

REID (D. McKinley). **On the Bacteriology of Asylum Dysentery in England.**—*Jl. of Mental Science.* 1913. Oct. Vol. 59. No. 247. pp. 621-640.

The author in the first part of his paper shows that in the past organisms approaching the Flexner type of dysentery bacilli have been usually isolated from patients suffering from asylum dysentery. He describes the technique used during his research, which consisted in plating the faeces on MacConkey's media, incubating for thirty-six hours, and then making subcultures from three of the non-lactose fermenting organisms.

Dealing with thirty-seven cases showing dysenteric symptoms, he was able to isolate Flexner-like bacilli from twenty-eight, either during life or post mortem. Of the remaining nine cases three showed organisms of the Gaertner group; *B. proteus*, *B. pyocyaneus*, *B. foecalis alkaligenes*, and an organism resembling the Shiga bacillus were each isolated on one occasion, while in two cases only lactose fermenters were found. Twenty control cases who had diarrhœa but no dysenteric symptoms failed to show any dysentery bacilli.

A table is given showing the date of the onset of the disease, when the bacteriological examination was made, the result of this examination, mortality, etc.; the principal point elucidated by this table is that the earlier the examination is made after the onset of the disease the greater is the likelihood of isolating dysentery bacilli.

The author next investigated the action of the various bacilli isolated on various sugars, etc., the results being given in a table. This, like all such tables, is somewhat confusing, but with one exception the bacilli appear all mannite fermenters and to approach the Flexner type.

Agglutination tests were carried out:—

1.—With the patient's organism and serum. The dilutions used were from one in fifty to one in four hundred, and it was common to obtain agglutination with dilutions of one in one hundred and sixty to one in three hundred and twenty. This agglutination was noticed once as early as the third day of the disease, but usually appeared later, was well developed at the end of a fortnight, and lasted often for months.

2.—With the patient's serum and a stock culture of B. Flexner, the agglutination thus obtained was usually present in rather lower dilutions.

3.—With the patient's organism and rabbit Flexner immune serum, the titre of this serum was one in 20,000 against a stock B. Flexner; sixty-four per cent. of the organisms isolated by the author were agglutinated in one in 20,000 dilution, thirty-three per cent. in one in 10,000, and three per cent. in one in 5,000.

A few animal experiments were made, two rabbits being inoculated intravenously; there was a fatal result in thirty-six hours with the typical lesions. Feeding experiments failed.

[With regard to the fermentation of sugars by the various strains of dysentery bacilli no one following the literature can fail to be struck by the discordant results obtained by various authors, and most probably such will continue to be the case until all workers use only absolutely pure sugars and exercise the greatest care in the manufacture

of the media. Maltose appears to be the sugar which causes most trouble. A paper by BUTLER appeared lately emphasizing these points (this *Bulletin*, vol. 2, page 397).]

S. R. D.

NATONEK (D.). **Zur Kenntnis der Dysenteriebacillen.** [A Contribution to the Knowledge of Dysentery Bacilli.]—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Nov. 15. Vol. 71. No. 5-7. pp. 337-338.

In a previous paper along with RAUBITSCHEK (*Centralblatt für Bakteriologie*. 1. Abt., Orig. vol. 69. 1913. p. 241), the author has shown that from a single case of typhoid fever numerous strains of typhoid bacilli may be obtained, differing definitely in their cultural reactions. With the Shiga-Kruse bacillus, however, the author finds that this is not the case. From two cases of Shiga-Kruse dysentery eighty-three cultures were made, but they all showed absolute correspondence in their type of growth and sugar-reactions.

S. R. D.

BUSCH. **Ueber serumfeste Ruhrstämme.** [On Serum-fast Strains of Dysentery Bacilli.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Nov. 15. Vol. 71. No. 5-7. pp. 515-520.

A record of agglutination results with bacilli isolated from two sporadic cases of dysentery, with remarks.

S. R. D.

FRIEDMANN (M.). **Die Ruhrepidemie beim Ulanenregiment Nr. 1 in der Kaiser Franz Josefs-Kaserne in Lemberg.** [The Epidemic of Dysentery in the First Uhlan Regiment, in the Kaiser Franz Joseph Barrack at Lemberg.]—*Der Militärarzt.* 1913. July 12. Vol. 47. No. 13. pp. 178-182; July 26. No. 14. pp. 185-190; and Aug. 9. No. 15. pp. 195-198. [Published with Nos. 29, 31 and 33 of the *Wiener Med. Wochenschr.* of those dates.]

A very complete account of an outbreak of bacillary dysentery which attacked eighty-seven men of the 1st Uhlan regiment of the garrison of Lemberg in August, 1912. No other troops in the garrison were affected, nor the civil population of the town. The local supplies of water and milk were examined and found to be beyond suspicion, and eventually the disease was found to have been imported by one soldier on his return from furlough, which had been spent in a place where bacillary dysentery was prevalent at the time. This man was admitted to hospital on August 3rd, suffering severely from the disease, and died a few days afterwards. From that date onwards until the 27th of the same month, eighty-six more men were admitted in small batches, suffering from the same complaint. Of these, forty-nine belonged to the man's own squadron and twenty-three and fourteen respectively to the two other squadrons of the same regiment. Only two cases proved fatal altogether, owing to the promptness with which the symptoms were treated, but the average stay of the cases in hospital was thirty-three days, showing a severe type of the disease.

It was eventually ascertained that the disease had been communicated from man to man through the dirty habits of soldiers when using the regimental latrines, and also from the prevalent habit of

removing horse-dung with the naked hands from the stalls of the stables and elsewhere, instead of using any appliances for the purpose. Sitting down to meals with unwashed hands would follow, especially in the case of men upon picket duty. As military surgeons have often pointed out before, cavalry soldiers are particularly liable to epidemics of dysentery and other diarrhœal complaints, because men on duty in the lines and stables have to use the stalls and manure heaps as latrines when on guard almost inevitably. Disease is thus propagated with great facility throughout an entire regiment. Nor could the agency of flies be altogether excluded, because the outbreak occurred in hot summer weather.

The epidemic was suppressed by enforcing the most rigid habits of cleanliness amongst all men in the regiment when using latrines. A sentry was placed outside each one, who saw that every man put on a special pair of stable clogs before entering the latrine and took them off afterwards so as to keep his boots clean. Every man on leaving was also obliged to wash his hands in water provided for the purpose. All door handles, floors and seats were washed over several times daily with antiseptics, and a proper supply of toilet paper provided. The trenches were disinfected with lime. A similarly rigid practice was enforced in barrack-rooms before sitting down to meals, and all utensils, weapons and accoutrements were carefully sponged over and cleaned with antiseptic. The entire regiment was isolated from the rest of the garrison, and all dirty linen was sent to the wash separately in disinfected bags and vehicles. Thanks to these precautions no further cases occurred after the 27th of August.

As regards the treatment of men in hospital, twenty-eight received injections of dysentery serum in doses of 20 cc., apparently with great benefit. In some cases the dose was repeated. The stools of all convalescents were tested bacteriologically, and no man was discharged from hospital until the result had proved negative upon three successive tests made within fourteen days. The bacillus isolated was in every case of the Shiga-Kruse type. This result was obtained with :—

8	patients	after	an illness of	6	days' duration.
22	,,	,,	,,	12	,,
10	,,	,,	,,	14	,,
6	,,	,,	,,	15	,,
5	,,	,,	,,	23	,,
7	,,	,,	,,	28	,,
9	,,	,,	,,	32	,,

In addition, all men released from hospital had their stools disinfected for from two to three weeks afterwards, even though the previous bacteriological examination had been negative, special receptacles being used for the purpose. Finally, the whole barrack was disinfected, room by room, with all its contents, and the men belonging to each room were compelled to purify their persons by a special hot bath, and to put on clean or disinfected clothing before being allowed to re-enter it, by which means the epidemic was finally brought to an end without extending beyond the regiment originally attacked.

The entire paper is well worth perusal by military surgeons as an example of the way in which such epidemics should be dealt with.

S. R. D.

CANAVAN (M. M.). **Third Note* on the Persistence of Agglutinins for *Bacillus Dysentericae* in the Danvers Hospital Cases.**—*Boston Med. & Surg. Jl.* 1913. Oct. 30. Vol. 149. No. 18. pp. 643-645.

This paper records an investigation into the persistence of the agglutinins for *B. dysentericae* in the blood of patients who have passed through an attack of the disease. The patients from whom the blood was derived appear to have had their dysentery in 1908. The results are given in the following table :—

		B. Shiga.			B. Flexner.		
Dilution of Serum.		1–20.	1–40.	1–80.	1–20.	1–40.	1–80.
Case No. 87.							
Oct.	1908	+	+	+	+	+	+
Feb.	1909	0	0	0	+?	+?	0
Mar.	1909	++	0	0	+	0	0
Jan.	1910	+	0	0	0	0	0
Apr.	1910	+	+	+	0	0	0
Dec.	1911	0	0	0	0	0	0
Case No. 90.							
Oct.	1908	+	0	0	+	+	+
Feb.	1909	++	++	+	0	0	0
Mar.	1909	+	+	—	0	0	0
Jan.	1910	+	+	+	0	0	0
Apr.	1910	+	+	+	0	0	+
Dec.	1911	+	0	0	0	0	0
Case No. 99.							
Oct.	1908	++	++	++	0	0	0
Feb.	1909	+	0	0	+	+	0
Mar.	1909	++	0	0	+	0	0
Jan.	1910	+	+	0	0	0	0
Apr.	1910	+	+	+	0	0	0
Dec.	1910	0	0	0	0	0	0
Case No. 101.							
Oct.	1908	+	+	+	0	0	0
Feb.	1909	0	0	0	+	+	0
Mar.	1909	0	0	0	+	0	0
Jan.	1910	0	0	0	0	0	0
Apr.	1910	0	0	0	0	0	0
Dec.	1911	0	0	0	+	+	+
Case No. 107.							
Oct.	1908	0	0	0	0	0	0
Feb.	1909	0	0	0	0	0	0
Mar.	1909	0	0	0	+	+	+
Jan.	1910	0	0	0	0	0	0
Dec.	1911	+	+	?	0	0	0
Case No. 108.							
Oct.	1908	++	++	++	0	0	0
Feb.	1909	0	0	0	0	0	0
Mar.	1909	0	0	0	+	0	0
Jan.	1910	0	0	0	+	0	0
Apr.	1910	0	0	0	0	0	0
Dec.	1911	+	+	+	0	0	0
Case No. 110.							
Oct.	1908	0	0	0	0	0	0
Feb.	1909	0	0	0	++	++	++
Mar.	1909	0	0	0	0	0	0
Jan.	1910	0	0	0	+	+	0
Apr.	1910	+	+?	0	0	+?	0
June	1910	0	0	0	+	+	0
Dec.	1911	0	0	0	0	0	0

* For first and second notes see *Boston Med. & Surg. Jl.*, 1909, Nov. 11, vol. 161, & 1910, Aug. 4th, vol. 163.

In case No. 121, the patient, who had had dysentery sixteen years before 1911, gave an agglutination to B. Flexner in one in eighty dilution in 1910, and in a dilution of one in twenty in 1911. The author believes the agglutinating of the serum varies from time to time, but that this should be the case, unless the patients are "carriers" of dysentery organisms, appears unlikely. A possible explanation of these variations is that the ease with which the organisms are agglutinated varies; such is certainly the case with cultures of *B. typhosus*, which are well known to vary greatly with regard to the ease with which they are agglutinated with specific sera, and at times cultures, especially those which have been subcultured on artificial media for long periods, are quite unaffected by agglutinating sera.

S. R. D.

i. Bauer (J.), Ellenbeck & Fromme. **Ueber Y-Ruhr bei Säuglingen und kleinen Kindern.** [On Y-Dysentery in Breast-fed Infants and Young Children.]—*Arch. f. Kinderheilkunde.* Festschrift A. Baginsky. 1913. Vol. 60-61. pp. 35-84. With 17 curves.

ii. Siegel (E.). **Ueber Y-Ruhr bei Säuglingen.** pp. 689-698.

i. This paper, though of immense length, contains few facts of general interest. It describes an outbreak of bacillary dysentery in a charitable institution for indigent mothers and their children at Düsseldorf. To reduce the expenses of the institution a laundry formed part of it, which took in washing from the town. Probably in this way bacillary dysentery was introduced into the institution, the mothers who worked in the laundry also washing their infants under not altogether satisfactory conditions of cleanliness. The outbreak was only brought to an end by sending off to the public hospital all the affected children, and such of the mothers and nurses as showed a positive serum-reaction to the bacillus isolated from the stools of the children, which was of the Y-type. That such laundries will form a good channel of infection seems obvious, and therefore they should be discouraged where infants are congregated together in large numbers and are washed, quite probably, with dirty water from the laundry, to save trouble.

ii. The clinical histories of eight children, all under one year of age, who were affected with dysentery due to the Y-bacillus. Out of the eight, four died. The stools contained blood in all cases. The most efficacious treatment seemed to be to keep the children on a so-called hunger diet for one to two days, nothing but tea being given; this was followed by malt-broth, (*Malz-suppe*) as recommended by Wilderhofer, and buttermilk. Albumen water seemed to be less successful.

S. D. R.

Rogers (Leonard). **i. The Rational Treatment of Chronic Bacillary Dysentery; and the Advantages of Enemata of Silver Gelatose.**—*Brit. Med. Jl.* 1913. Nov. 8. pp. 1198-1200.

ii. The Bactericidal Action of Organic Silver Salts and other Antiseptics on the Dysentery Bacillus.—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 263-269.

The author's first point of interest is a statement that in chronic

bacillary dysentery the lesions are nearly always limited to the lower portion of the large intestine, and that in consequence of this distribution remedies administered rectally are much more likely to be efficacious than if the upper part of the large intestine was affected. The author then gives the results of experiments carried out by him *in vitro* to determine the bactericidal action of various antiseptics against the dysentery bacilli; the experiments were carried out with emulsions of bacilli made both with water and with broth. The result is interesting, for whereas solutions of nitrate of silver killed the watery emulsions of dysentery bacilli in dilutions of one in 10,000 yet when the emulsions were made with broth one in 100 to one in 500 was the greatest dilution that had killing power. When, however, organic silver compounds were used it was found that the broth had no inhibitory power, that solutions of one in 500 of such a substance as silver gelatose were quite equal to the same substance's power in the presence of watery emulsions.

Further experiments showed that broth had a marked inhibitory effect on the action of various antiseptics such as permanganate of potash, quinine bisulphate and boracic acid.

The author concluded that the substances most likely to exert an efficient bactericidal action would be the organic silver compounds, and he states that on treating chronic bacillary dysentery cases with enemata of these compounds his hopes were completely justified.

Details of three cases are given, and an analysis of some further cases is added, most of which quickly improved under this treatment.

S. R. D.

Mixed Dysentery.

Cunningham (J.). **A Résumé of our present knowledge of Dysentery.** —*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1. pp. 92-118.

The author gives in this paper a very good account of our knowledge of dysentery up to the time of its publication. The discordant results obtained in the biochemical tests applied to separate the varieties of dysentery bacilli are very well shown in various tables. As regards amœbic dysentery events have travelled so fast that the author's account of the rôle of the various amœbae and entamœbae has already become out of date, but at the time of publication his account was a good one of the various opinions on these subjects.

S. R. D.

Rodgers (R. T.). **Dysentery in the Raipur Central Jail, C.P.**—*Indian Med. Gaz.* 1913. Nov. Vol. 48. No. 11. pp. 424-428. With 2 charts.

This paper consists of a rather confused account of the dysentery occurring in the Raipur Central jail. The principal points of interest related are :—

1.—That the greatest incidence of the disease is during the wet weather.

2.—Ankylostomiasis is not an important factor.

3.—That the disease is most probably of the bacillary type, and as good results were obtained both in treatment and prophylaxis with a

vaccine prepared from *B. dysentericae* Shiga, the author believes this to be the peccant organism.

4.—Trichomonas was found in thirty-one out of thirty-five cases of dysentery: this organism was not more than 10μ in length, and frequently only 6 or 7μ, but the author appears very uncertain to what extent it was to blame in the production of the dysenteric symptoms.

5.—Amoebic dysentery was uncommon.

S. R. D.

RODENWALDT (E.). **Dysenterie in Togo.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. p. 842.

The author in previous communications has tried to show that in Togoland bacillary dysentery is the form met with on the coast, whilst in the interior amoebic dysentery is more prevalent. About half a dozen fresh cases are cited in support of this opinion.

S. R. D.

HINTZE (K.). **Operieren oder Nichtoperieren bei chronischer Dysenterie.** [The Question of Operating or not Operating in Chronic Dysentery.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Sept. Vol. 17. No. 17. pp. 581-592. With 4 charts.

In opposition to the views expressed by O. MÜLLER, of Hongkong, recommending appendicostomy as a routine operation in cases of chronic dysentery (this *Bulletin*, vol. 1, p. 187), the author discusses what can be done by milder remedial measures in such cases. He points out that in amoebic dysentery ipecacuanha is often not given in sufficiently massive doses, and that in any case the practitioner has now ROGERS's treatment with emetin to fall back upon. Details are given of four cases in which such treatment was persisted in until cure, one case receiving as much as 8¼ grains of hydrochloride of emetin hypodermically, in the course of twelve days. With regard to bacillary dysentery the author places most faith in the persistent employment of large enemata of water with or without the addition of tannin or silver nitrate. Sufficient perseverance with these remedies is almost always successful in his own practice.

S. R. D.

LESSING (Frank M.). **Note on Ozone in the Treatment of Dysentery.**—*Lancet.* 1913. Nov. 1. p. 1255.

The account of a case of dysentery at first treated without benefit with ipecacuanha and opium. The following treatment was then tried: The large intestine was washed out with ozonised water, large quantities of this ozonised water were also administered by the mouth, and the air of the sick room was ozonised. The author, although stating that treatment with ipecacuanha and emetine was continued, seems to believe that the improvement which took place was largely due to the ozone.

S. R. D.

Stiles (C. W.) & Keister (Wm. S.). **Flies as Carriers of Lamblia. Spores. The Contamination of Food with Human Excreta.**—*U.S. Public Health Rep.* 1913. Nov. 28. Vol 28. No. 48. pp. 2530-2534.

The authors, after referring to a paper by one of them (Stiles), in which he concluded that the presence of *Entamœba coli*, Lamblia or Trichomonas in the stools of seemingly normal individuals is a proof of fæcal contamination of the food, and that the frequency of such contamination can be gauged by estimating the percentage of the population which harbours these parasites (see this *Bulletin*, vol. 1, p.724), proceed to investigate the rôle played by flies as carriers of these parasites. The conclusion arrived at that flies commonly act as spores of these protozoa does not seem very conclusive; whereas in communities having a sewer system of drainage as many as twenty per cent. of the population were infected, in those communities in which open privies were in use and a veritable plague of flies was present, having free access both to the privies and food of the inhabitants, and in which there were many other sources of infection, only a further ten per cent. of the population harboured these parasites.

S. R. D.

Balantidial Dysentery.

Behrenroth (E.). **Das *Balantidium coli* und seine pathogene Bedeutung.** [*Balantidium coli* and its Pathogenic Significance.] —*Arch. f. Verdauungs-Krankheiten.* 1913. Oct. 15. Vol. 19. pp. 42-62. With 2 text-figs.

A case of intestinal ulceration in Prussia due to *Balantidium coli*. The patient, a farm labourer aged sixty-one, was admitted to hospital suffering from diarrhœa of some six weeks' duration, along with emaciation and progressive weakness. The stools numbered from fourteen to sixteen in a day, and were foul-smelling, pultaceous and alkaline. The microscope showed large numbers of an organism which was recognized as *Balantidium coli*. Examination of the rectum with the rectoscope showed congestion and superficial ulceration with, at one point, a distinct tumour with raised and thickened edges, covered with mucus. Treatment was initiated on June 5th with thymol, given in four gramme doses every two days. Immediate improvement ensued, the stools being reduced to two or three a day, of nearly formed consistence, but as the microscope still showed the presence of infusoria, mostly dead or encysted, the treatment was changed on the 20th of the same month to de-emetinized ipecacuanha, given in pills containing six centigrammes each, to the number of thirty a day. The number was gradually increased to sixty pills a day, and afterwards reduced to forty pills, with the result that by July 4th all the symptoms had subsided, and treatment was discontinued. A rectal examination showed that all the local lesions were healed, and the microscopic examination of the stools was negative.

Balantidium coli is a ciliate protozoan belonging to the order Heterotricha, covered all over with cilia and consequently capable of active movement. It possesses two nuclei and two contractile vacuoles, a funnel-shaped mouth and an anus. The size varies, but may be

given at an average as 114 by 74μ. It multiplies by division, but sexual conjugation has not been observed with certainty. Its normal host is the pig, in the colon of which it is to be looked for principally near the caecum. It does not seem to cause any pathological lesions in the pig. Two allied forms, *B. minutum* and *B. giganteum* have been described as causing similar lesions in man. The organism seems to have been first detected in man by the celebrated microscopist LEEUWENHOCK, when examining his stools when suffering from diarrhœa. It was again described by MALMSTEN in 1856, and from that time up to the present 142 cases of its occurrence in man seem to have been recorded, the majority in Finland, Russia, and Sweden. [Many cases have been recently described from the Tropics.] In the majority of instances in the human being the patients have been farm workers, and so brought into contact with pigs. Dirty hands are probably the medium of infection.

The lesion caused in the human subject by *Balantidium coli* takes the form of chronic ulceration of the colon, resulting in diarrhœa, emaciation and loss of strength. The disease may prove fatal by the continuance of these symptoms. One case of intestinal perforation is on record. The disease never extends above the ileo-caecal valve. The symptoms are as given above. There is never any marked pyrexia whereby the condition may be distinguished from enteric fever or dysentery, which it otherwise resembles. The spleen is never enlarged, and there is never any metastasis to the liver or other organs, though one doubtful case of a lung abscess is reported. Microscopic examination of the stools will show innumerable motile organisms. These seem to be able to penetrate into the submucous tissue in the same way as amœbae. The condition does not seem to show much tendency to natural cure, and may last for months or years, if it does not prove fatal.

Injections of various substances into the bowel have been tried, such as quinine (one per 1,000), acetic and tannic acids (fifty grammes of acetic acid and five grammes of tannin in two litres of water), iodine (one in 5,000), silver nitrate (one in 3,000), salicylic acid (one in 2,000) and so on, all more or less ineffective. The author's treatment of four grammes of thymol, given by the mouth in divided doses, seems as good as any method for checking the diarrhœa, but the symptoms return when the medicament is stopped, for which reason the author resorted to de-emetinized ipecacuanha. In one case appendicostomy has been performed with subsequent washing out of the bowel with quinine and nitrate of silver solutions; the result was brilliant. Specific anti-bodies do not seem to be formed in the affected individuals.

Infection experiments with lower animals seem generally to be unsuccessful. LÖSCH succeeded on one occasion in producing in a dog bloody stools containing Balantidia, and after death found inflammation of the rectal mucous membrane, and three superficial ulcers containing the organism. On one occasion also a kitten was made a carrier of the organism for a short period. With these exceptions man seems to be the only organism to which the infusorian is pathogenic.

An excellent bibliography of the cases reported, chiefly German, concludes the paper.

S. R. D.

BRAU. **Dysenterie balantidienne en Cochinchine.**—*Soc. Med.-Chirurg. de l'Indochine.* 1913. Oct. Vol. 4. No. pp. 384-387

In the author's opinion this disease is an uncommon one in Cochinchina. Two cases are reported, one a native soldier, the other a European. The organisms found in the native were 30-35μ in length and 20μ in breadth; movements were rapid and the cilia very apparent. In the other case the organism was enormous, being about 200μ in length and 70μ in breadth.

The organisms suddenly disappeared from the stools without any treatment. Both patients were very anaemic and had diarrhoea.

S. R. D.

SPRUE.

CANTLIE (James). **Some Recent Observations on Sprue.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1296-1297.

The author draws attention to the following symptoms occurring in the course of sprue.

1. Temperature. A continued fever almost certainly indicates the last and fatal stage of the disease.

2. Neuralgia of the anus may occur even without any lesion such as fissure, and is a late symptom.

3. Tetany. During the last 18 months the author has seen 6 cases of muscular spasm in sprue, accompanied with marked anaemia. These spasms may be very severe, accompanied even by unconsciousness and fever as high as 103° F. These attacks do not imply a fatal issue of the malady.

4. Prolapse of the sigmoid into the rectum may occur, but is uncommon.

With regard to treatment, the author lauds collosol argentum (CROOKES) as a drug.

With regard to diet the meat treatment is recommended, or alternating diets of meat, milk, and farinaceous foods, for periods of three days; on no account should such diets be combined. Strawberries, he states, still hold their position as a curative agent and, failing these, ripe raw gooseberries or the juice of blackberries.

S. R. D.

St. Leede (C.). **Ein Fall von Sprue durch Erdbeeren gebessert.** [A Case of Sprue benefited by a Diet of Strawberries.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1913. Oct. 8. Vol. 75. No. 3. pp. 578-586.

The author observes that there is very little to be found on the subject of sprue in German medical literature, and that his countrymen at home have but few opportunities of becoming acquainted with the disease. For this reason he thinks the account of a case may be interesting.

The patient was a married woman of middle age, who returned to the United States in 1906, after a long residence in Porto Rico. The disease first showed itself in painful aphthous ulceration of the tongue and buccal mucous membrane. This seemed to be made worse by the eating of fruit, particularly strawberries. In March, 1912, considerable looseness of the bowels supervened without any obvious exciting cause. Between early morning and 2 p.m. as many as 10 stools of the characteristic type would be passed, but this symptom never disturbed the patient during the hours of sleep. There was no particular abdominal pain, but considerable discomfort from flatulence and borborygmi. Gradually the general health of the patient became impaired, with loss of flesh and spirits, and much coldness of the extremities. At this stage the patient sought the author's advice, and was admitted to a private hospital. The blood on examination showed normal corpuscular elements, but the haemoglobin was 50 per cent. below the normal by Sahli's haemoglobinometer. The gastric juice, after a test meal, showed 2·8 per mille of free hydrochloric acid, and a total acidity of 5·2. As the patient declared that the eating of strawberries and other fruit had always aggravated her symptoms, the medical treatment of the condition was initiated by recourse to other remedies, like bismuth, opium, and castor oil. No benefit being obtained, an exclusive milk diet was tried, with confinement to bed. This reduced the number of stools to one per diem, but a troublesome constipation supervened which required the use of enemas. Tannin injections into the lower bowel caused insupportable pain. Finally recourse was had to a diet of strawberries, which happened to be in season, beginning with only two at a time, and the quantity being gradually increased. The result was startling. On this diet improvement in every particular rapidly took place. In America strawberries can be had from March to Christmas, so that there was no difficulty in continuing the diet, and the patient was sent to California for that purpose. Though at the time of writing the cure was not complete, the benefit received was so great that the author feels justified in putting the case on record.

Conformably to the experience of other practitioners, it was found that strawberries preserved in any form, either with or without sugar, are not the equivalent of the fresh fruit, suggesting the idea that the beneficial principle is destroyed by heating.

S. R. D.

FILARIASIS.

Low (G. C.) and Others. **Discussion on Filariasis.** (British Medical Association.)—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1298-1300.

In opening the discussion Low reviews the various papers published during the year ending July, 1913, commenting in turn upon the views expressed by the different authors. OUZILLEAU's indictment of *F. volvulus* as a cause of elephantiasis in the Mbomu region of the Congo is not regarded as trustworthy. The results of FULLEBORN and BAHR are quoted to emphasize the contradistinction in periodicity between the microfilaria of Samoa, Fiji, etc., and that in the Bismarck Archipelago. FULLEBORN and FOLEY have dealt exhaustively with the differences determinable between *Filaria diurna* and *Filaria nocturna*.

The work of LOW, WISE and MINETT upon the diseased conditions produced by *F. bancrofti* makes it clear that the filariae, by damaging the tissues, may allow the ingress of organisms, which in turn set up purulent foci, either localized or diffuse if the main lymphatics are involved. KONDOLEON, ROSANOW, PELLETIER, and MÜLLER propose new operations for elephantiasis, while lymphangioplasty is discredited by MADDEN, IBRAHIM, and FERGUSON. As many of the cases operated upon were non-tropical, it is suggested that the condition is commoner in temperate zones than was supposed, and has, of course, other cause than filaria.

Low points out that the geographical distribution of *Filaria bancrofti* is often peculiarly and inexplicably unequal; thus in Grenada with apparently ideal conditions of climate and intermediaries, the infection is practically non-existent. The absence of hyperfilariation is also a problem which calls for solution, and it is suggested that possibly there is a struggle for existence even among the filariae. Another problem is the ultimate end of the embryos which must constantly be dying in the blood stream.

Further work is needed on the pathology and pathological anatomy of the diseased conditions due to *F. bancrofti*. BAHR has pointed out that destruction and fibrosis due to the worms in the lymphatic glands must lead to an increased difficulty in the passage of the lymph through those affected, and Low has shown how easy is the blockage of the intra-abdominal glands which drain the lymph from the lower limbs.

A number of problems as regards *F. loa* are restated. Why are embryos absent from the blood in some cases where adult females are known to be present in the tissues? In what way do the worms induce Calabar swellings? As *F. loa* does not seem to produce abcesses, when it dies, what becomes of it?

The whole subject of helminthic eosinophilia is regarded as an attractive piece of research work.

Dr. DUNCAN WHYTE (Swatow, China) endorsed Dr. Low's statement regarding the absence of hyperfilariation. In three filariasis patients from whom elephantiasis scroti had been surgically removed, the embryos could be found in the peripheral blood for from a week to ten days. A verdict of " not proven " should be brought in on the question of the pathogenicity of *F. bancrofti*. The arguments used were of the

same kind as those directed to the incrimination of *F. perstans* as the cause of sleeping sickness.

Dr. R. Fleming Jones remarked that the patchy distribution of elephantiasis was well illustrated in British New Guinea. Whereas he found there an average of seven per cent. of infection with microfilariae, nearly all his cases of elephantiasis came from one small district. This suggested symbiosis.

Dr. Bahr demonstrated the specimens collected by him in Fiji. Adult filariae, he stated, were common in the lymphatic glands in Fiji, and induced (1) giant cell formation, and (2) fibrosis. They acted upon the tissues by their presence and by their excreta and toxins. On death they became calcified and resulted in (1) mechanical blocking, (2) fibrosis, and (3) endothelial proliferation of the lymphatic vessels. Filarial abcesses were due primarily to the filaria, secondarily to streptococci and staphylococci. In lymphangitis the lymph was generally sterile. The lack of periodicity in the blood of man of the Fiji filaria seemed to be a distinct adaption to the habits of its favourite intermediary, *Stegomyia pseudo-scutellaris*. Lymphangitis came on periodically, because [hypothetically] the filaria had definite breeding seasons and the emission of microfilariae only took place at definite periods, causing the lymphangitis. Microfilariae disappeared from the blood after an attack of lymphangitis.

Prof. Wasielewski suggested that the lesions of filariasis might be explained if it was supposed that the filariae produced a chemical effect.

R. T. Leiper.

Fülleborn. **Die Filarien des Menschen.**—*Handbuch der pathogenen Mikroorganismen.* (Kolle & Wassermann.) 1913. 2nd edit. Vol. 8. pp. 185-344. With 6 plates and 41 text-figs.

An excellent account of the human blood filariae. Everything of any importance that has been done on the subject is mentioned. Many diagrams, photographs and coloured plates add greatly to the value of the work, as does also the very full and accurate account of the literature. The monograph takes up 159 pages. It may confidently be stated that it will form the standard work on human filariasis for many a day to come, and at the same time it will prove of inestimable value as a work of reference to all workers on this special branch of tropical medicine.

G. C. Low.

Marotte & Morvan. **Filariose et Natalité.**—*Arch. de Parasitologie.* 1913. July 10. Vol. 16. No. 2. pp. 306-313.

The data for the above paper were obtained from a battalion of Senegalese troops in Algiers. [See also this *Bulletin*, vol. 2, p. 87.] Some more statistics are now given. For example, as a rule, men have been found to be more often infected than women, 29·28 per cent. in the case of single men and 31·52 per cent. in the married, figures appreciably equal. Of 122 children examined only one was found infected, a girl of four years. The father and mother of this child were filariated. Of 354 households examined 127 were found to contain

carriers of microfilaria. In 25 of these both husband and wife were filariated; in the other 102 one only, namely the man in 86, the female in 16.

The extreme rarity of the disease in children up to 13 is interesting, though the authors do not believe it can be attributable to a natural immunity due to age or to a very long incubation period; the cause of this peculiarity is still uncertain.

The species of filaria encountered were *Filaria bancrofti*, *F. perstans* and *F. loa*. A small and large variety of *perstans* is described.

[As already pointed out in this *Bulletin* (vol. 2, p. 88) the smallness of the figures employed in many instances render the percentages misleading.]

G. C. L.

MOUCHET (R.). **Notes Anatomiques et Médicales sur la Pathologie du Moyen Congo.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Vol. 17. No. 19. pp. 657-669. [Filariasis. pp. 667-668.]

Embryonic forms of *Filaria diurna* and *perstans* are very abundant in the regions around Leopoldville in the Middle Congo, but the author states that he has never found *Filaria bancrofti*.

The embryos found in the peripheral blood are very abundant in the hot hours of the day, and apparently are found more frequently during the wet season than the dry. Elephantiasis is rare, two cases only having been seen, one of the scrotum and one of the vulva.

Onchocerca volvulus is frequently seen, in some cases there being as many as 12-15 small tumours present. These are generally situated about the iliac crests.

G. C. L.

MAROTTE & MORVAN. **L'Eosinophilie dans la Filariose.**—*Compt. Rend. Soc. Biol.* 1913. Oct. 24. Vol. 75. No. 29. pp. 241-243.

The subject of eosinophilia in filariasis was studied by the authors in a battalion of Senegalese natives in Algiers [see this *Bulletin*, vol. 2, p. 87] comprising 1,339 individuals—811 men, 386 women, and 142 children. More than three thousand stained slides were examined, and the results of these are given in the following table :—

Among	3	carrying embryos of	*F. loa*	2	cases of eosinophilia.
,,	88	,,	,, *F. bancrofti*	0	,, ,,
,,	208	,,	,, *F. perstans;*	1	case of ,,
,,	14	,,	,, different kinds	0	cases of ,,

The absence of eosinophilia in so many of their cases is pointed out and is specially commented upon.

[Such a condition has already been described by Low in natives of Uganda; many of these, although harbouring many intestinal as well as filarial parasites, showing no eosinophilia (see this *Bulletin*, vol. 1, p. 108.)]

G. C. L.

FILARIA LOA.

BRUNETIÈRE. **La Filaire de l'Oeil (*Filaria loa*) peut-elle déterminer des Complications cérébrales ?**—*Gaz. Hebdomadaire des Sci. Méd. de Bordeaux.* 1913. July 27. Vol. 34. No. 30. pp. 351-353.

In 1911 two cases of *Filaria loa* infection were presented to the

French Ophthalmological Society. As the author points out, the ocular symptoms produced by this parasite have often been studied; he now asks, can cerebral complications be produced by it as well? The history of a case is given. The patient, thirty years of age, with no specific history, developed a well-marked right-sided hemiplegia. This was supposed at first to be due to a cysticercus cyst in the brain, but finally this idea was abandoned. Two further hypotheses were next advanced, viz., endocarditis and filariasis. The author admits that the patient was suffering from a mitral lesion, but he is not inclined to attribute the embolus to it. He suggests rather that the condition was caused by an adult filaria or probably by a mass of microfilariae occluding some of the terminal ramifications of the left middle cerebral artery in the Sylvian fissure.

[The evidence that the *Filaria loa* was the cause of the condition in this instance is not very striking, but at the same time the possibility of cerebral symptoms must be kept in mind. The reviewer once saw a case of *Filaria loa* infection who presented headaches and other cerebral disturbances for which no other definite cause could be assigned.]

G. C. L.

Rogers (W.). **A Note on a Case of "*Loa*" *Loa*.**—*Annals Trop. Med. & Parasitology.* 1913. Nov. 7. Vol. 7. No. 3B. pp. 363-365.

From May, 1906 to June, 1907, Dr. Rogers resided in Southern Nigeria. From July to November, 1907, while living in Wales, he had evanescent thickening of one or other leg and some oedema about the ankle which lasted a day or two. Various diagnoses were made, including rheumatism, cellulitis, erythema nodosum, etc. From November, 1907, to December 1908, he again lived in Africa (Lagos Protectorate), but finally settled in Wales in March, 1909. In the late summer of that year fugitive swellings appeared in various parts of the body, generally in the neighbourhood of joints. They were painless, but associated with stiffness and, strangely enough, were even now not diagnosed. In November, 1909, a *Filaria loa* crossed the bridge of the nose, and from that time onward signs of the presence of the worm or worms have been frequent. Sometimes the Calabar swellings were localized, but later there was a tendency for them to involve a greater part of the circumference of one or other of the limbs.

When a worm appeared on the face, it generally made its way towards one or other eye; then it usually made one or two tours round the eye, either in the lid or in the ocular conjunctiva and then crossed the bridge of the nose to the other eye. While in this vicinity it was always visible under the skin. After visiting the eye sometimes the parasite wandered over the scalp, its curve being easily traceable by the tender area and later localised swelling. The presence of the worm about the eye was always accompanied by a pricking, boring pain; when under the conjunctiva it caused severe conjunctivitis with redness, dilated vessels, feeling of grit, headache, etc.

Towards the end of 1912 a worm was removed from under the conjunctiva—an immature female; after this the usual symptoms disappeared for some time, but later Calabar swellings again developed.

Blood examination showed an eosinophilia of 3-5 per cent., but as the author also suffered from bilharziasis, it is difficult to say to which

of the parasites this was due. Later a second worm, a mature female, was removed.

[A case such as this should be well worth following up closely, and as the life history of the parasite is a long one, symptoms may be expected for years to come. It is unfortunate that no record appears to have been kept of the presence or absence of embryonic forms in the peripheral blood. Such an examination might even now be made with advantage.]

G. C. L.

Schultz (Nadine). **Ein Fall von menschlicher Filaria-Infektion.** [A Case of Human Filaria Infection.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Nov. 15. Vol. 71. No. 5-7. pp. 410-413. With 1 text-fig.

A case of *Filaria loa* infection, seen in St. Petersburg, is described. The patient, it is stated, lived in the South [? where] for one month. Eight months after a filaria appeared in the right eye under the conjunctiva. Apparently also, as far as one can judge from the context of the paper, embryos were present in the peripheral blood. A description of these is given, but there is nothing new in that nor in the other parts of the paper.

[The paper is valueless because no details are given as to where the patient lived when in the Tropics, nor as to whether the filaria in the blood had any periodicity, nor as to the many other points required for accurate diagnosis of such parasites. The literature also is incomplete and worthless. The author has evidently very little experience or knowledge of the subject of filariasis.]

G. C. L.

Onchocerciasis.

Fülleborn & Simon. **Untersuchungen über das Vorkommen der Larven von *Onchocerca volvulus* in Lymphdrüsen und in der Zirkulation.** [Researches on the Presence of the Larvae of *Onchocerca volvulus* in the Lymph Glands and Circulation.]—i. *Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 843-844; and ii. *Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Nov. Vol. 17. *Beiheft* 9. pp. 5-18 (501-514). With 2 plates.

i. One of the authors (Simon) found filarial embryos in the inguinal lymph glands and blood of a native suffering from volvulus tumours near the right superior iliac spine. These were large and unsheathed, and he believed that they might represent the embryonic forms of *Onchocerca volvulus*. Fülleborn examined the material and could make out no difference between specimens from volvulus tumours and those from the glands and blood preparations. On the other hand they differed characteristically from the embryos of *loa*, *perstans* and *demarquayi*.

Ouzilleau [see this *Bulletin*, vol. 1, p. 419] has described similar embryonic filariae in lymph glands of patients suffering from *O. volvulus*. Simon suggests that when such embryonic forms are found in blood smears, it is only in specimens where much pressure has been employed in squeezing out the blood, a considerable amount of lymph having exuded as well. In preparations made in the ordinary manner they are not seen.

ii.—In this paper the authors expand their observations, a series of accurate measurements and comparisons of measurements with the known embryonic filariae being given. The material was collected by Simon from a native of the English Gold Coast, forty-five years of age, who was operated upon for a femoral hernia. The lymph glands were obtained during the operation and, as already stated, were found to contain filarial embryos. Though ordinary blood preparations taken at different hours of the day and night showed no embryos, Simon found that if he squeezed the finger powerfully in making the specimens, non-sheathed embryos of a size comparable to *bancrofti* embryos appeared. These specimens and the other material have now been carefully examined and measured by Fülleborn, who has studied the percentage results of the different anatomical fixed points and has compared them with those of *F. bancrofti* and *F. loa* embryos. The results of these measurements are easily seen in the subjoined table.

Percentage results of the anatomical fixed points in relation to the Length (Average.)

		Nerve Ring.	G¹ Cell.	End of the last Tail cell.	Total Length in μ
1. *Microfilaria volvulus* from the uterus of the female.	(*a*) in wet Formalin preparations	—	—	—	298·0
	(*b*) in dry preparations from Formalin material.....	24·2	69·51	95·61	269·2
2. Microfilariae from the Lymph-glands of *volvulus* carriers	(*a*) in wet Formalin preparations	—	—	—	313·5
	(*b*) in dry preparations from Formalin material.....	23·55	69·24	95·52	297·5
	(*c*) in dry preparations from fresh material	24·3	68·9	95·5	224·5
3. Microfilariae from blood preparations of *volvulus* carriers.	(*a*) in wet Formalin preparations	—	—	—	—
	(*b*) in dry preparations from Formalin material.....	—	—	—	—
	(*c*) in dry preparations from fresh material	23·77	69·6	96·3	274·3
	(*c*) in dry preparation from acetic acid blood centrifugate	23·17	69·9	95·77	258·2

Comparing the measurements in this table with the similar ones of the embryos of *Filaria bancrofti* and *F. loa* the author draws up the following table:—

	Nerve ring.	G¹ cell.	End of the last tail cells.
Mf. bancrofti ..	19·6	70·6	95·1
Mf. loa ..	21·6	68·6	Quite or nearly quite at the end.
Mf. volvulus ..	24.2	69·51	95·61

The different possibilities of what these embryos may be is next discussed, Fülleborn rightly claiming that the absence of a sheath in well-stained haematoxylin specimens clearly differentiates them from *bancrofti* and *loa* larvae. The sharp-pointed tail and general size likewise show they are not *F. perstans*.

[From Fülleborn's measurements it is at once seen that the embryos found in the lymph glands and blood of the native infected with *volvulus* cysts closely correspond with—or one might say, are the same as—the real embryos of *O. volvulus*. These observations confirm Ouzilleau's statements, but even granting that embryos are present in the glands it does not follow that they can produce elephantiasis as the latter claims.]

G. C. L.

Rodenwaldt (E.). **Eine neue Mikrofilarie des Menschen.** [A New Human Microfilaria.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Vol. 17. No. 23. p. 843.

In a native of Bassari, North Togo, in whose blood numerous *Filaria perstans* embryos were present, the author found another filarial embryo which, he believes, presents differences from both those of *F. bancrofti* and *F. loa*. The new embryos showed no periodicity, while in the finer morphology of their different anatomical points they seemed to be midway between the two just mentioned. The question as to whether they might be the embryos of *Onchocerca volvulus* is considered, but apparently they are not exactly similar to such embryos removed from volvulus tumours by puncture. A further development might, of course, occur later in the blood, as the author suggests.

[Until more details, measurements, anatomy, etc., are forthcoming, one can say nothing as to what this embryonic filaria may be.]

G. C. L.

Filariasis of Animals.

Pricolo (Antonio). **Sur la Filaire Hématique du Chameau.**—*Centralbl. f. Bakt.* 1 Abt. Orig. 1913. Vol. 71. Nos. 2-3. pp. 199-200.

The author has followed up his studies on the larval filariae found in the blood of camels by himself in Tripoli [see this *Bulletin*, vol. 1, p. 425.] Adult parasites, male and female, have now been found by him twice in the blood vessels of the lungs, and six times in those of the testicles. In the lungs, where the parasites were found, calcareous nodules also occurred, but, as these were also found in the walls of the intestines and in the liver, the author is doubtful if they are connected in any way with the filariae. In the testicles sclerotic hypertrophic changes were present. A description of the adults is next given and, the name of *Filaria haematica cameli* is proposed for them, the author believing that it has nothing in common with another worm which has been encountered in dromedaries in the colony of Eritrea, in the tissues of the neck. The female measures 22 cm. in length and 666μ in breadth. The eggs are oval in contour and contain embryos in different degrees of development, they measure 32 by 12–15μ. The male in appearance is like fine catgut, measuring 8-12 cm. in length, with a breadth of 300μ. The parasites, as already stated, are found in the

blood vessels where, their presence may set up aneurismal dilatations. Other morbid conditions may be caused by them. No further description of the embryos is given.

G. C. L.

Stefko (W.). **La Filariose des Oiseaux de la Russie Centrale.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 592-594.

Marzinovsky was the first to discover Microfilaria in birds in Central Russia (*Corvus cornix L., C. moned., L.*, and *Luscina philomelae*).

The investigations which form the subject of the present article concern chiefly *Corvus frug. L.* (a bird wintering sometimes in Northern Africa). 42·1 per cent. of *C. frug.* were found to be infected. The microfilariae were found only in the blood of old birds which had migrated, not in young birds indigenous to the country. Similar observations were made on *Corvus moned.* and *Garrulus glandarius.*

[The fact that only old birds which had migrated showed filarial infection indicates that the parasites must be acquired in Northern Africa.]

G. C. L.

Elephantiasis.

Taylor (Adrian S.). **Elephantiasis of Scrotum.**—*China Med. Jl.* 1913. Nov. Vol. 27. No. 6. pp. 388-390. With 3 text figs.

The author thinks that the details of the operation for elephantiasis scroti as given in books of tropical medicine are too scanty. As he also believes that a method used by himself is superior to that described by Manson and Castellani and Chalmers, he gives a description of it. This, briefly, is as follows :—

After the part has been sterilised a long rubber tube is wound round the base of the tumour and is held there and prevented from slipping by towel clamps—one anteriorly in the pubic region, one in front of the anus, and one each side, all, of course, being clamped below the tourniquet. This method is preferred to the usual one of the figure of eight round the waist.

A long sagittal incision is now made from a point on the pubis in good skin, perpendicularly downward through the preputial opening along the median raphe to a point in good skin in the perineum in front of the anus. The penis is then dissected out. After this is done the tumour is boldly disected and each half laid over on its respective side. This allows of the testicles being approached from the median aspect instead of by the usually recommended primary perpendicular incisions, their position nearer the median line rendering this a useful procedure. They and the cords are then carefully isolated, any hydroceles present being attended to, and are finally turned up with the penis till the tumour is removed.

Working from within outwards the elephantoid tissue is cut away from the perineum till the skin is reached, and as soon as the tumour is cleared away from the mid-line—from the pubis anteriorily to the anus posteriorly—the skin is cut through, this releasing the whole tumour mass.

As soon as bleeding is stopped, as much of the preputial mucous membrane as necessary is turned back and used for a part of the covering of the penis.

The testicles are placed in as normal position as possible, and covered over with the flaps saved from the sides of the tumour. The everted mucous membrane is stitched to the edges of the skin and the incision is then closed horizontally across the pubic region down to the penis and from here downward vertically, making a T shaped closure. It is surprising how normal the parts appear after the operation.

The author claims that his method has the following advantages:

(1) a minimum amount of work is done from the external surface of the tumour inwards and the danger of infection is thus lessened; (2) the heavy tumour has to be lifted very little, and as it is cut in two it falls apart and rests between the patient's legs on the table; (3) the mass is gradually liberated by working from the mid-line externally and from before backwards, with the tissues to be cut in plain sight, so that if necessary every bit of tissue may be clamped before cutting, and thus loss of blood avoided; (4) the testicles are easily reached by blunt dissection, with little danger of injury, and the cords can easily be isolated as high up as desired.

G. C. L.

Ouzilleau. **L'Eléphantiasis et les Filarioses dans le M'Bomou (Haut-Oubangui). Rôle de la *Filaria volvulus*.**—*Ann. d'Hyg. et Méd. Colon.* 1913. July-Aug.-Sept. Vol. 16. No. 3. pp. 688-709.

The author continues his paper on elephantiasis and filariasis in the M'Bomou district [see this *Bulletin*, vol. 2, p. 426.] He returns to the suggestion that the *Onchocerca volvulus* may give rise to elephantiasis. He does not, however, produce any further evidence how a parasite living in cysts in the subcutaneous tissues could produce the train of symptoms seen in this disease.

[The idea of *Onchocerca volvulus* having anything to do with the etiology of elephantiasis has already been criticised, *loc. cit.* vol. 1, p. 419.]

G. C. L.

Branch (Edmund R.). **Salvarsan in Filariasis.**—*Jl. Trop. Med. & Hyg.* 1913. Dec. 1. Vol. 16. No. 23. pp. 364-365. With 1 text-fig.

From an experience of nineteen cases of filariasis [variety not stated] treated by salvarsan, the author has noted: (1) a diminution of the febrile attacks; (2) a healing of ulcers of a chronic and indolent nature; (3) a reduction in the size of some elephantoid limbs; and (4) a general improvement in the health of the patients.

As many of these cases had also suffered from syphilis, the author rightly states that the remarkable improvement in their health could not be attributed only or chiefly to the absence of filarial attacks; but, in other instances, cases uncomplicated by syphilis showed a marked improvement in their health after salvarsan treatment.

[Though not definitely stated, the context of the paper suggests that the author is dealing with cases of elephantiasis and the febrile attacks (filarial lymphangitis or elephantoid fever) which accompany that condition. It is possible and indeed probable that salvarsan, which after all is an arsenical, may benefit this condition, but as to the drug killing the adult filariae, where those are alive and actively breeding in ordinary cases of filariasis there is no proof. Most workers who have tried it find that it does not do so. The author's statement that embryos disappeared from the blood after treatment with salvarsan requires explanation, because in the class of case he was dealing with larval forms of filariae are conspicuous by their absence.]

G. C. L.

CHOLERA.

KOBLER (G.). **Zur Frage der Choleraübertragung durch Nahrungsmittel.** [The Part played by Food in the Spread of Cholera.]—*Wien. Med. Wochenschr.* 1913. Sept. 20. Vol. 63. No. 39. pp. 2493-2496.

The International Sanitary Convention of Dresden, 1893, attached little importance to the risk of food-stuffs in spreading cholera. France in the anti-cholera campaign of 1911 permitted the free entrance of fruit and vegetables. Roumania forbade the entrance of fruit and milk from Turkey during the last epidemic. Servia forbade grapes. The Bosnia-Herzogovina Authorities (1911) forbade the importation of fruit and vegetables, because of the opinion of ROUX that, though these things were not very dangerous, still they were not entirely free from danger, and also because GAFFKY had shown that cholera vibrios remained alive and virulent on fruit for four to five days. ZABOLOTNY showed that ices had caused cholera in several cases in St. Petersburg (1908–1909).

The author, on reviewing all the evidence, considers that where an interval of several days between export from a cholera district and consumption in a new district occurs the danger is negligible, but where the interval of time is small a real danger does exist. He believes that States immediately neighbouring infected ones ought to adopt restrictive measures in special cases. Mussels have been shown to be able to convey cholera (RAUCHETT, Milan). Milk, butter, vegetables and fruits are foods which should be carefully handled and distributed, especially within short range of their origin. POLLAK showed cholera vibrios remained alive on apples up to the 16th day. He further showed that when putrefactive organisms appeared on fruits the cholera vibrios were rapidly destroyed.

W. J. Penfold.

EMMERICH (Rudolf). **Zur Aetiologie der Cholera asiatica.**—[The Etiology of Cholera.]—*Jl. of State Med.* 1913. Oct. Vol. 21. No. 10. pp. 604-609. With Discussion, pp. 609-611.

The author discusses anew the theory that nitrites and nitrous acid are the toxic agents in cholera. He believes the latter is toxic directly and also indirectly, oxidising the amino groups of the living protein. This latter action affects especially the epithelial cells of the intestines. In response to the acute irritation of this epithelium, a large amount of alkaline fluid is poured into the gut, which neutralizes the free nitrous acid. Nitrous acid is present in the vomit and stools and urine in cholera, but not in normal control stools. The spasms of muscle are alleged to be due to liberation of nitrous acid from nitrites by the lactic acid present in muscle.

The oxidation disturbances caused by the nitrites are said by the author to be the cause of acidosis, cyanosis and hypothermia. Free nitrous acid is alleged to be produced in the kidney, which is thereby damaged. Secondary intoxications, the author believes, follow the injury of the gut, these toxic agents being indol, nitroso-indol, lactic acid, oxyacids, and other substances.

Emmerich draws attention to the facts (1) that cholera toxin and endotoxin when introduced into the stomach and intestine even in great quantity are harmless, (2) the intestinal mucus is acid after death in 50 per cent. of cholera cases.

He discusses the opposition of METSCHNIKOFF and CHONKEWITCH to his theory. They cited BERTHELOT as having shown that rabbit milk was free from nitrates. From this they concluded there was no source of nitrite available. Emmerich, however, cites RATTENFUSSER as having disproved this, and having shown that rabbit milk contains a considerable quantity of nitrate. Human milk, on the other hand, is nitrate-free, and Emmerich points out that breast-fed children are likewise free.

Professor SCHELLER, of Breslau, attacked the hypothesis of Emmerich, but none of his points appear entirely new.

W. J. P.

ORTICONI & SARTORY (A.). **Le Choléra.**—*Gaz. des Hôpit. Civils et Militaires.* 1913. Oct. 11. Vol. 86. No. 116. pp. 1805-1813 & Oct. 18. No. 119. pp. 1853-1859.

Il Colera.—*Riforma Medica.* 1913. Nov. 5. Vol. 29. No. 46. pp. 1280-1281.

A general review of the subject, no fresh work being communicated. It is well-balanced, but contains nothing new. It is surprising to find no mention of the work of ROGERS in the section dealing with treatment.

W. J. P.

GOÉRÉ (J.). **Le Choléra à Ferryville (Tunisie) en 1911. Étude Clinique et Bactériologique.**—*Arch. de Méd. et Pharm. Navales.* 1913. Sept. Vol. 100. No. 9. pp. 207-215; and Oct. No. 10. pp. 266-278.

The paper contains an account of three cases of cholera. The first patient was in hospital suffering from albuminuria when he was attacked by cholera; during the choleraic diarrhoea he was free from albuminuria which, however, returned when convalescence from cholera was established. The second and third cases presented no noteworthy features.

The injection of normal saline was used as the principal treatment when the pulse was feeble or temperature fell. It appeared to give good results; alcohol, friction and lactic acid were also used. Fourteen per cent. of carriers were found amongst the people who had been in contact with the cholera cases. The carriers were treated with potassium permanganate with apparently good results. None gave a positive agglutination test.

None of the cases could be traced to contaminated water, but their infection appeared rather to be due to direct contact with other cases. The methods of isolation were the usual ones, and the vibrios found were of the classical type of KOCH. The author found that patients' serum taken during the attack in no single case agglutinated the specific organism. Agglutinins first appeared in the serum during the four or five days following recovery; they disappeared almost

entirely after two months, and in no case was the titre of the serum ever higher than $\frac{1}{500}$. The agglutination was most marked with the strain of organism isolated from the patient whose serum was under examination.

In no case did the serum of any healthy carrier agglutinate the bacillus, nor did the serum of any one of ten healthy control individuals who were not carriers. All the vibrios isolated agglutinated on first trial, but the author describes two strains (isolated in Marseilles), which did not agglutinate on isolation, but did subsequently after five and six subcultures on agar respectively. He also describes two strains isolated from one loop of bowel, which agreed with each other in all points except that one was agglutinable and the other not. The action of alcohol and acids on the strains isolated was tested, when it was found that 5 c.c. of vinegar per litre sterilized water containing the cholera germ after four hours, and 10 c.c. per litre after twenty-five minutes. He recommends this for use in times of epidemics.

W. J. P.

GALLAS. **Le Choléra dans l'Inde française.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.* 1913. July-Aug.-Sept. Vol. 16. No. 3. pp. 767-776.

The seasonal prevalence of cholera in Pondicherry and Karika is described. It is currently believed amongst the natives that cholera appears with the first rains and stops when the dry season is well established. The dry season lasts from January to July, when the first rains appear; heavy autumn rains commence in the second fortnight of October and last till the end of November. In 1910 and 1911 the curves of rainfall and external temperature varied fairly closely with the cholera incidence. The dry and warm months (March to June) show little cholera. In October, 1910, however, when the rains were very heavy, the epidemic stopped, while in 1911, with moderate rains, the epidemic continued. Gallas believes this to be due to the effective cleansing influence of very heavy rains, while moderate rain encourages the growth of the organisms outside the body.

The occurrence of epidemic outbreaks is due to (*a*) bad hygienic conditions, (*b*) diarrhoea due to sudden fall of temperature, occasioned by the rains, (*c*) the formation of pools of water, which are excellent culture media for the vibrios. Water-borne epidemics have been the exception; the majority of cases have been more or less isolated; a direct contact with patients and carriers would appear to be the principal cause of dissemination of the disease.

Treatment in the early stage was effective, but in the algid stage was never of any use in the case of natives, all dying who got into this condition. Caffeine, camphor oil, sparteine, normal and hypertonic salines, and permanganate of soda were all used.

The fatalism of the natives and their social habits render it difficult to apply preventive measures. For two years Pondicherry has had a good water supply, and in the town itself the cholera incidence has recently been almost nil. Notification is not carried out in many cases

though it is legally required. The natives object to the removal of infected cases to hospital. Disinfectants are supplied at trifling cost to the public.

W. J. P.

ZIROLIA (G.). **Ueber einen aus Brunnenwasser gezüchteten Choleravibrio, Ursache einer Choleraepidemie.** [On a Cholera Vibrio cultivated from Spring Water, the cause of a Cholera Epidemic.] —*Hygienische Rundschau.* 1913. Sept. 15. Vol. 23. No. 18. pp. 1081-1085.

In the summer of 1911, in the province of Genoa, a cholera epidemic occurred. During this epidemic a small town, Sori, seventeen kilometres from Genoa, became suddenly infected on the 14th of August, eight cases occurring together. The water was suspected as a cause. During the summer the water supply of Sori is almost entirely derived from one spring. This supply was stopped on the notification of the cases. By the 24th of August there were thirty-one cases. The spring in question is quite close to a small river running through the town, and it was believed to have been contaminated from the river, in which, probably, infected clothes had been washed.

This water was examined bacteriologically. It was inoculated into peptone water, and after ten hours alkaline agar plates were made; in this way the cholera vibrio was recovered and identified from quantities of 2 c.c. upwards. The vibrio gave all the typical cholera reactions and agglutinated to $\frac{1}{5000}$ with a specific serum having a titre of $\frac{1}{5000}$. Cholera vibrios isolated from the patients could not be distinguished from it. The infected water was allowed to stand in the laboratory at a temperature of 16°–22° C. and showed the vibrios up to the 62nd day. Zirolia found the vibrio's power of being agglutinated was greater after remaining in the water sixty-two days; the virulence under the same conditions had diminished.

W. J. P.

v. KONSCHEGG (A.) & WELTMANN (O.). **Ueber einen Fall von choleraähnlicher Erkrankung, hevorgerufen durch einen pathogenen Vibrio.** [A case clinically resembling Cholera, caused by a Pathogenic Vibrio.]—*Oesterreichische Sanitätswesen.* 1913. Oct. 16. Vol. 25. No. 42. pp. 1401-1406.

The patient was admitted to hospital in Vienna on suspicion of cholera on the 8th June, 1911. The attack commenced six days before admission. During this time vomiting occurred about thrice daily, and greenish liquid stools were passed two or three times a day. Peptone water cultures of the stools showed, after six hours, a typical scum containing vibrios only, and a marked cholera red reaction was obtainable at this time. The fresh strain and the strain after several subcultures on agar were tested against a specific serum, but did not agglutinate. The strain was not lysed *in vivo* by a specific cholera serum. It was morphologically identical with the typical cholera vibrio, and it agreed with the latter in all the cultural and biochemical tests. The patient's serum agglutinated the strain fully

in $\frac{1}{500}$ dilution, while normal serum agglutinated it only slightly in $\frac{1}{50}$ dilution, so that it probably was pathogenic in the patient.

A specific serum was made by injecting the strain into rabbits; the serum so obtained had a titre of $\frac{1}{20000}$. The serum was tested against ten other strains of well known vibrios, two being genuine cholera strains, and, with the exception of Deneke's vibrios, none of these agglutinated in $\frac{1}{10}$ dilution; even Deneke's vibrio agglutinated in dilutions of $\frac{1}{100}$ slightly, but not higher. The authors, therefore, come to the conclusion that the organism is not closely related to any hitherto described.

W. J. P.

GREIG (E. D. W.). **Preliminary Note on the Occurrence of the Comma bacillus in the Urine of Cases of Cholera.**—*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1. pp. 90-91.

The author examined the urine in fifty-five cases of cholera for the comma bacillus, and found it in eight of the cases. The organism was fully identified by morphological, cultural, and serum tests. Up to the present no systematic examination of the urine has been made in cholera cases for the specific organism, so that this is a new observation, and suggests the disease is in many cases of a septicaemic nature.

W. J. P.

GREIG (E. D. W.). **An Investigation on the Occurrence of the Cholera Vibrio in the Biliary Passages.**—*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1. pp. 44-58. With 3 plates.

The author reviews the literature of the subject briefly, from which it appears that the cholera vibrio occurs in the bile in about 40 to 70 per cent. of the cases.

Greig examined the bile in 271 fatal cases, and found the cholera organism present in 80, and that in 12 of these pathological lesions of the gall bladder were present. The cholera organism grows well in the bile, and its entrance into the gall bladder is of great importance from the carrier standpoint.

The technique pursued does not call for remark. A table dealing with the 271 cases gives date of death, pathological condition of the gall bladder and the presence of the vibrio in the bile alone or in mixed culture. If the vibrio was found it was usually in pure culture. The mode of entrance of the germ into the gall bladder is discussed, but no definite evidence on the point produced. The fact that cholera germs may be found in the blood and lung suggests the possibility of its being deposited in the gall bladder from the blood. The pathological changes in the wall of the gall bladder include the casting off of portions of the mucous membrane, and cellular increase in the sub-mucous layer where vibrios may be also microscopically demonstrated.

W. J. P.

WELCKER (A.). i. **Cholera- und Typhusgangrän. Die symmetrische Gangrän im Balkankriege kein Frostschaden.** [Cholera and Typhoid Gangrene.]—*Zentralbl. f. Chirurgie.* 1913. Oct. 18. Vol. 40. No. 42. pp. 1625-1628.

ii. **Nachtrag zur "Cholera- und Typhusgangrän, u. s. w."** *Ibid.* Nov. 15. No. 46. pp. 1769-1773. With 6 figs.

i. The communication is of a preliminary character. The author was with the Bulgarian forces during the Balkan War. He saw a large number of cases of gangrene, and from a consideration of 115, carefully investigated, he concluded that cholera was an important exciting cause. Eighty of these 115, 7 to 17 days before the onset of gangrene, suffered from cholera; 20 others gave histories of dysentery or diarrhoea; 5 of the remaining cases gave a history of obscure illness, which the author suggests may have been cholera without diarrhoea.

The author similarly observed in 45 other cases gangrene following typhoid fever. The gangrene occurred two to three weeks after the onset, or not infrequently during the convalescent period. The gangrenes considered were not due to cold.

The medical officers with the Turkish army likewise saw a large number of cases of gangrene, but failed to correlate it with cholera.

The commonest type of cholera gangrene was symmetrical gangrene of both feet. Five cases of gangrene of the fingers and one of the cornea occurred, but it never affected the nose or ears. Two to three per cent. of the cholera survivors suffered from gangrene.

Gangrene, following cholera, has been described in ALLBUTT and ROLLESTON'S system of medicine, but it does not seem to have attracted much attention.

ii. The author returns to the question of the causation of this epidemic gangrene. Similar gangrene in the Turkish forces was attributed to cold and frost; he carefully goes over the differential diagnosis, which is as follows:—

SYMMETRICAL GANGRENE.	FROST GANGRENE.
History of cholera, typhoid, or dysentery.	History of cold without a specific infection. Usually follows sleeping on the field or in trenches.
Arises in hospital.	Come for treatment on account of results of cold.
Intense pain as premonitory symptom.	Local anaesthesia.
Limb or finger destroyed in entire thickness, including bone.	Bone not affected. The superficial part affected as in a burn of the 3rd degree.
No vesicles, marked cyanosis, subjective feelings of cold.	Vesicles present on affected part. Anaesthesia of parts proximal to gangrenous portion of limb.
Coldness of part persistent.	On second or third day high fever and signs of local reaction.
Temperature rises on demarcation or secondary infection.	

The diarrhoeal attacks which followed the gangrene in some of Welcker's patients were to be regarded simply as relapses of the initial disease.

W. J. P.

Newton (H. Martyn). **Cholera.** *Medical Missions in India.* 1913. Oct. Vol. 19. No. 75. pp. 143–147.

An account of a local cholera epidemic.

Treatment in 12 cases consisted of hypertonic saline given subcutaneously; of these patients three died. Of 81 cases not so treated, 41 per cent. died. Local prejudice appears to be strong against European methods of prevention and treatment.

W. J. P.

Logan (O. T.). **The "Wholesale" Treatment of Cholera.** *China Med. Jl.* 1913. Sept. Vol. 27. No. 5. pp. 302-314. With 5 figs.

Dr. Logan, residing in Changteh, records the "wholesale" treatment he used in a cholera epidemic of 1913.

The epidemic was probably due to the very marked dryness of the season, and to the lowering of the waters of the local river at a time when the Yangtse was relatively high. The author believes that these conditions favoured the growth of the specific organisms. The contamination progressed by water; all the towns overlooking the river were successively affected. As a preventive method, the author caused a sandwich man to parade the town with instructions as to how one might avoid cholera.

The author discusses native preventive methods and amongst them the chewing of brass cash, this being highly esteemed. The method which he successfully used was that of Rogers, with hypertonic saline solution; he obtained a 77 per cent. recovery rate, the same percentage that Rogers had in India.

The author, concomitantly with the intravenous injections, administered drinks containing one or two grains to the pint of potassium permanganate or, better still, of calcium permanganate.

W. J. P.

Laboratory and Experimental.

Hofer (Gustav) & Hovorka (Jaroslav). **Versuche zur elektiven Ausgestaltung des Dieudonnéschen Choleranährbodens.** [Experiments to Increase the Selective Character of Dieudonné's Medium.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Sept. 27. Vol. 71. No. 1. pp. 103-112.

The authors discuss the laboratory evidence of the selective value of Dieudonné's medium in dealing with natural and artificial cholera stools.

It was shown by Laubenheimer that this medium affected the form and staining of the vibrios, and also diminished their agglutinating power. The authors' results confirm the first two points and tend

to support the third. They show further, from their work at Kirk-Kilisse that *B. pyocyaneus, proteus, faecalis alcaligenes, fluorescens, mesentericus* types, cocci of different sizes and several unnamed bacilli grow on Dieudonné's agar quite well, so that it is by no means strictly selective. With the materials obtained on their expedition they commenced a research, with the idea of improving Dieudonné's medium as a selective agent. They found with a proportion of blood to alkali of 1:4 that all the cholera strains grew well, as also a few non-specific vibrios; on the other had, the cocci, coliform organisms, proteus, and paratyphoid B strains, all of which grew on the ordinary Dieudonné's medium, were entirely suppressed.

Efforts were then made by addition of different salts to the media to suppress the non-specific vibrios, but these were without result. It was found, however, by the addition of a little crystal violet, about 5 c.c. of a 1 per cent. solution to 10 c.c. of their modified Dieudonné's agar, that the non-specific vibrios could be suppressed, while all the specific vibrios developed.

W. J. P.

Liston (Wm. Glen.) **Report of the Bombay Bacteriological Laboratory for the Year 1912.**—39 pp. f'cap. 1913. Bombay: Government Central Press. Price 5 annas, or 6d. [Cholera pp. 23-25.]

The work of this section was carried out by Captain Gloster. The cholera-like vibrios which have been isolated and described by various workers are briefly mentioned, and their close association with the specific vibrio is pointed out. In Bombay (1912) vibrios were isolated from the stools of fifteen patients suffering from symptoms of cholera; four of these were foundto be non-agglutinating. These were obtained on the 2nd, 3rd, 8th and 10th days respectively of the patient's illness. The behaviour of the serum of these patients to the vibrios isolated in the respectivecases and to the typical cholera vibrio is discussed, but not in detail. From wells, a tank and sewage similar non-agglutinating vibrios were obtained which showed no constant cultural or morphological differences from true cholera. All the non-agglutinating vibrios were pathogenic for the guinea pig except one. The non-agglutinaters were more actively haemolytic to goats' red cells than the agglutinaters, while against human cells they were both actively haemolytic. Complement fixation as far as it was tested separated the agglutinaters from the non-agglutinaters.

Gloster does not believe the non-agglutinating vibrios are true cholera vibrios modified in their serum reaction, because of the differences in haemolytic power.

W. J. P.

Rotky (Karl). **Immunisierungsversuche gegen El Tor.** [Immunization against the El Tor Vibrio.]—*Prager Med. Wochenschr.* 1913. Vol. 38. No. 28. 5 pp.

The author states that his experiments have been somewhat contradictory, but he gives some representative results.

Immune sera were prepared by treating guinea pigs with, firstly, sterile fluid from subcutaneous oedema and serum of infected guinea

pigs, and secondly, with fluid from oedema containing the living vibrios. The serum so prepared was inactivated and used either with or without being exhausted by treatment with dead vibrios. Such a serum had a definite bactericidal effect *in vitro* in quantities of $\frac{1}{1000}$ of a c.c., while the same serum after exhaustion with the dead vibrios had no such effect in even $\frac{1}{10}$ c.c. quantities.

When the neutralizing power of this serum was tested on guinea pigs, it was found, however, that the exhausted serum had a marked protective influence even in quantities of $\frac{1}{1000}$ of a c.c.

Samples of fluid were taken from the peritoneum in the case of certain of the animal experiments and no phagocytosis or bacteriolysis was observed in the animals which had received the exhausted serum, though the vibrios diminished in numbers. Similar results were obtained in the case of mice and rabbits. The results are believed to be due to an anti-aggressin immunity.

W. J. P.

Bindi Nello. **Ricerche circa l'Affermata Modificabilità del Vibrione Colerigeno in Ambiente Idrico.** [Researches on the Alleged Modifications of the V. cholerae induced by Water.]—*Ann. d'Igiene Sperimentale.* 1913. Vol. 23. (New Ser.) No. 3. pp. 243-251. With 1 fig.

The water used in one series of experiments was being perpetually renewed, the organism being introduced into Berkefeld filters; in another series a definite quantity of water was taken and not changed throughout, though it was kept in movement. The properties examined were agglutination, susceptibility to lysis, and complement fixation. Seven strains of organisms were used. Every four days the agglutination tests were undertaken and found not to have altered. Bacteriolysis of strains was tested after twenty-four, forty, and seventy-two days, and no changes discovered. Fixation of complement tests also remained the same. The author cannot reconcile these with many opposing findings in the literature.

W. J. P.

Cano (U.). **Ueber die Wanderung des Choleravibrios im Körper des befallenen Tieres.** [On the Dissemination of Comma Bacilli in the Body of Infected Animals.]—*Centralbl f. Bakt.* 1. Abt. Orig. 1913. Dec. 16. Vol. 72. No. 3. pp. 124-126.

Rabbits not more than twenty days old were used for the experiments. Each received 5 c.c. of cholera broth culture by the mouth, which was fatal in all cases within 40 hours. The vibrios were recovered from the heart blood four times, cervical glands three times, liver twice, kidneys six times, and bladder four times out of nine animals experimentally infected. The bacilli were recovered from the heart's blood in one case six hours from the time of feeding with the culture.

W. J. P.

PUNTONI (Vittorio). **Azione della Tossina colerica sull'Intestino degli Animali sotto l'Influenza del Caldo Umido.** [On the Action of Cholera toxin on the Intestine of Animals under the Influence of Moist Heat.]—*Gazz. d. Ospedali e. d. Cliniche.* 1913. Nov. 23. Vol. 34. No. 140. pp. 1466-1469.

The paper recounts experiments investigating the cause of the higher case mortality from cholera and other diarrhoeal cases in the tropics. Variations of virulence of the organism are excluded from the research. The experiments were done with cholera toxins, obtained from three different vibrios by SANARELLI's method. The animals selected for experiment were guinea pigs. The toxins were administered by the mouth daily with sufficient saturated sodium carbonate solution to produce slight abrasions of the mucus membrane of the gut. One series of animals was kept at 17° to 19° C with 50 to 60 per cent. saturation of the air, the other series at 30–32° C with 90–95 per cent. saturation of the air. All the toxins were found to be much more potent in the case of the animals in the warm humid atmosphere.

W. J. P.

CARRIERS.

GREIG (E. D. W.). i. **An Investigation of an Epidemic of Cholera caused by a "Carrier."**—*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1. pp. 59-64.

ii. **An Investigation of Cholera Convalescents and Contacts in India.** *Ibid.* pp. 65-89. With a Map.

i. In Puri jail an epidemic of cholera occurred during the months of July and August of 1912. It was introduced by a prisoner admitted on the 23rd of July, who had been discharged from the cholera hospital on the 13th of July of the same year. On the 28th of July his faeces were found to contain a large number of cholera vibrios. A few days after admission cases of cholera commenced to occur in the ward in which he lived.

In the bacteriological examination peptone water was used in two successive cultures as an enriching medium before plating. Agar and Dieudonné agar plates were used and suspected colonies picked off and tested against a specific serum at once.

The faeces of the carrier were examined five times between July 28th and August 4th, and showed large numbers of specific vibrios on each occasion. A table is given showing the results of the examinations of the stools in the case of the 17 persons attacked and the terminations of the cases. A chart shows the incidence of the cases. The interest of the epidemic is that it proves almost beyond doubt that cholera carriers may cause an epidemic, and that the discharge of carriers from hospital is highly dangerous.

ii. The work was done on patients discharged from the Puri Hospital in 1912. The stools of 30 convalescents, at the time of discharge from hospital, were examined, and 36 per cent. of them were found to be excreting cholera vibrios. The geographical distribution in India of these convalescent pilgrims is carefully considered, and the significance of it in the spread of infection discussed. As an appendix to the paper a full account of the examination of the stools of the

cholera convalescents in a jail epidemic is given. The same patients were likewise tested for agglutinins in the serum. These histories show quite clearly that three consecutive negative results in the examination of the stools of convalescents by no means establish freedom from cholera carriage. This method has been recently suggested as sufficient, but Greig found as many as fifteen examinations negative and the next one positive. Non-agglutinating vibrios were found from time to time in convalescents free from the specific vibrios, but their significance is not elucidated. It appears that the detection of agglutinins in convalescents suggests cholera carriage. The temporary staff in charge of cholera cases was examined and six persons were found to be carriers out of 27 examined.

The question of dealing with convalescents and contacts is discussed. Segregation and destruction of the vibrios outside the body are the only means available at present. W. J. P.

DEFRESSINE (C.) & CAZENEUVE (H.). **Sur la Persistance du Vibrion Cholérique dans l'Organisme humain et dans quelques Milieux extérieurs.**—*Arch. de Méd. et. Pharm. Navales.* 1913. Nov. Vol. 100. No. 11. pp. 366-376.

The authors consider briefly the healthy, convalescent and chronic intermittent carriers.

In the case of healthy carriers mention is made of the work of PFEIFFER during the epidemics which developed from 1892 to 1896 in the basin of the Vistula. This observer found in a family of ten that four died of cholera, one showed grave symptoms and survived, two showed a slight form, while the other three who showed no symtoms of enteritis passed vibrios in their stools. Similar cases illustrative of this were found in subsequent epidemics in the Indies, Philippines, in Russia, Germany, Italy, Holland, and France, 20 per cent. of these healthy carriers were shown by Russian observers (1908–1909) to suffer subsequently from cholera, *i.e.*, they were "porteurs précoces." The commission of the Sanitary Conference of Paris (1911) concluded that carriers were few outside the epidemic foci or at the frontiers of infected countries, but many in the actual surroundings of the patients. This was illustrated by the authors' experience at Toulon in the autumn of 1911. In vessels coming from Tunis and Marseilles, where epidemics raged, 7 per cent. of healthy carriers were found amongst the sailors of uninfected ships, while in ships where cases had occurred no less than 44 per cent. were carriers. It appeared from these cases that the number of germs in the stools of healthy carriers was relatively small, and that the duration of the carrier state was found to last in no case more than eight days after the first discovery of the organisms in the stools. The strains isolated from the healthy carriers had all the typical characters of the specific germ. The convalescent carriers whose cases were investigated excreted specific vibrios on an average until the 11th or 12th day from the onset of symptoms of the disease, the longest persisting fifteen days. Three cases dead of cholera were examined *post mortem* for vibrios in the gall bladder, and these were present in each case. The findings suggested that the gall bladders were not infected *post mortem* or terminally. W. J. P.

Levi della Vida (Mario). **Portatori ed Emuntori di Germi patogeni. Alcune Osservazioni Serologiche sui Portatori del Vibrione Colerigeno.** [Healthy and Chronic Carriers of Pathogenic Germs.]—From Vol. "*In Onore del Professore Angelo Celli nel. 25° Anno di Insegnamento.*" 1913. pp. 373-400. [Turin: Unione Tip-Editrice Torinese.]

The author uses "chronic carrier" to signify a carrier who has been through an attack of the disease, while a healthy carrier is one who has not suffered from the specific disease induced by the organism carried. The former class are usually recognized by correlating the clinical history with the bacteriological finding. In the latter class, of course, no evidence of the disease is obtainable in the case of the carrier, but others in the entourage of the patient have had the disease, and in some cases it is possible to say they have been exposed to the same infection. Scheller's case is quoted, where a chronic carrier infected milk from which 18 individuals became carriers without getting the disease. The importance of the differentiation of the two classes is that the healthy carrier has been believed to emit fewer organisms and to carry for a relatively short period. The presence of antibodies in the blood of a carrier has been thought to suggest that the carrier is of the chronic rather than of the healthy type.

The author examined 48 carriers for agglutinins; he gives a short description of each case—all except nine were found to give a positive reaction. He also examined the serum of these cases for bactericidal power, but found it absent in some cases which agglutinated well; it was never present when agglutinating power was absent.

He finds that the carriers fall into two groups. (1) Carriers with specific antibodies in the serum; (2) those without such antibodies; the former are chronic carriers, the latter are healthy carriers. The length of time during which vibrios are eliminated gives, he finds, no help in classifying the carriers.

W. J. P.

Book Review.

Goldi (Prof. Dr. Emil A.). **Die sanitarisch-pathologische Bedeutung der Insekten und verwandten Gliedertiere, namentlich als Krankheits-Erreger und Krankheits-Ueberträger. Zyklus von Vorlesungen gehalten an der Universität Bern.** [The Importance in Pathology and Hygiene of Insects and Allied Arthropods, especially in relation to Disease.]—155 pp. With 178 figures. 1913. Berlin: R. Friedländer & Sohn. [Mk. 9, or 9s.]

This admirable little text-book, critically surveying that borderland between the two biological domains of animal pathology and entomology which every student of tropical medicine must now explore is to be particularly commended for its "practical" merits, since it concentrates attention upon the main disease-circumventing ends and purposes of the survey. The amount of information sifted and condensed, without loss of sapidity, in its 150 pages, is truly astonishing; more matter with less art it would be indeed hard to provide.

Entomology appears in the assigned role of handmaid to pathology in the division of the subject-matter into three sections, each of which deals with arthropoda in one particular pathogenic aspect.

The first section, which fills about 18 pages, treats of arthropods that cause smarts and more serious injuries by means of irritant or venomous secretions, that are either injected by a sting of some sort, or merely come in contact with the skin. Here are passed in rapid review *Aculeate Hymenoptera*, blister-beetles, scorpions, centipedes, spiders, and caterpillars possessing urticating hairs, in most cases the structure of the particular weapon of offence and the nature and effects of the particular venom being concisely described. This section is illustrated by a great abundance of figures, which compensates for the absence of any descriptions or diagnosis of the species and groups stigmatized as hurtful; for an acquaintance with systematic entomology is taken for granted.

Among interesting items that will probably surprise medical men whose experience is limited to the tropical regions of the Old World is the statement that in Mexico alone from 200 to 250 children annually succumb to the effects of the sting of scorpions. The treatment of stings in general is briefly considered, but no mention is made of cocain.

The 95 pages of the second section are occupied with parasitic arthropods, as such. These the author separates into (*a*) true parasites, like the tick-flies, fleas, lice, bugs, ticks, mites, bot-flies, etc., which are structurally organized for a parasitic habit, and (*b*) semiparasites, like blood-sucking *Nematocera*, blood-sucking *Muscidae*, and gad-flies, which, though not much less rapacious than true parasites, have no inherent structural impediments to freedom. One cannot, however but regard as unsatisfactory an arrangement of this kind that puts the tsetse-fly and the bed-bug in different categories; it would seem more reasonable to regard both these insects as true parasites, not by adaptive modification of structure, but by definite limitation of habit; just as (to illustrate by analogy) the Dipper (*Cinclus*) and the aquatic *Hymenoptera* are none the less truly and completely aquatic, though they have no trace of any of the structural modifications that obviously distinguish the typically aquatic bird and insect.

In the treatment of all these parasitic and semiparasitic groups the author concentrates on habits, manner of life, metamorphoses, structure of pertinent organs, incidence, significance, etc., with little attention to taxonomic detail, but with a profusion of most eloquent figures. The *Culicidae* are dealt with in this graphic and effective manner in about two dozen pages, and though the mushroom growth of mosquito-literature is depicted in vivid language, its general stimulating effect upon the official mind is commended. All that is needful is said about the *Simuliidae* and *Ceratopoginae* in five and a-half pages, and about lice and bugs in seven pages, and thanks to the abundance of well-chosen and well-

executed figures an excellent general impression of the ticks and their doings is conveyed in nine pages. The illustrations of the flies concerned in myiasis, both larvae and the adults into which they transform, are particularly good. On the other hand, a single page for *Phlebotomus* and two pages for the tsetse-flies, when compared with nine and a-half pages for *Tabanidae* and three and a-half pages for the *Pupipara* seems a little wanting in proportion, and the omission of the *Linguatulida* is surely an oversight unless, indeed, the author is not satisfied that this aberrant little group should be linked with the Arthropoda.

The third section, of 29 pages, is devoted to Arthropoda as carriers of various noxae. These the author distinguishes as (*a*) mechanical carriers, namely, houseflies and fleas; and (*b*) biological carriers, among which bugs and lice are included, as well as mosquitoes, tsetse-flies and ticks, an arrangement to which, perhaps, not everyone will assent. This section deals concisely and graphically with the development and location of various blood parasites of man and certain domestic animals in their several insect carriers, and with the ultimate pathological effects upon the final hosts. It also alludes, though rather inadequately, to the influence of the flea in connection with bubonic plague, and mentions some of the sanitary objections that have been raised against the house-fly. Like the other sections, it is most effectively illustrated.

A. Alcock.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 3.

PROTOZOOLOGY.

JOYEUX (C.). **Note sur quelques Protozoaires sanguicoles et intestinaux observés en Guinée francaise.**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 612-615.

The author records the finding of trypanosomes in 30 horses, seven of which died. Some of the trypanosomes are undetermined, but three of the hosts were infected with *T. cazalboui* (associated in one case with *T. dimorphon*). Of 16 other horses examined, seven only showed trypanosomes, two of these being infections of *T. cazalboui*, one of *T. dimorphon*, the others undetermined.

Among 19 donkeys examined, four never showed parasites, four died of trypanosomiasis (one of *T. cazalboui* and *T. pecaudi* mixed), and of the 11 others three showed *T. cazalboui*. The remaining trypanosomes were not determined.

Cattle born in the country, but of a stock originally coming from Fouta-Djallon, and of small size, never showed parasites. Cattle imported from Haut-Sénégal-Niger showed trypanosomes (six out of 50, in two cases *T. cazalboui*).

Native sheep were not very susceptible to *T. dimorphon*.

Among Cercopithecus monkeys *Plasmodium kochi* was seen in three out of nine examined.

The land tortoise, *Cinixys belliana*, is frequently parasitised (19 out of 34) by *Plasmodium roumei*.

Rats frequently contained *T. lewisi*, and *Grahamella* was seen in *Golunda fallax* and *Mus rattus*.

Stools of patients were examined for Protozoa. In 14 per cent. of those showing intestinal symptoms amoebae were found, sometimes exhibiting the characters of *Entamoeba tetragena*. By experiment the author found that native cats seemed to exhibit a certain immunity

to *E. tetragena*. *Balantidium coli* was seen in the stools of a Cynocephalus suffering from slight diarrhoea.

H. B. Fantham.

Rodhain (J.), Pons (C.), van den Branden (F.) & Bequaert (J.). **Rapport sur les Travaux de la Mission Scientifique du Katanga (Oct. 1910 à Sept. 1912).**—1913. Brussels: Hayez, Imprimeur de l'Académie Royale. [Royaume de Belgique—Ministère des Colonies.] Ch. 4 & 5, pp. 117–162.

Chapter IV of this report deals more especially with insect flagellates.

Leptomonas davidi was found in the latex of *Euphorbia indica;* it is probably spread by Hemiptera. A Leptomonas from several species of *Asilus* is figured; also a Leptomonas from the gut of the reduviid *Rhinocoris albopilosus*. Another *Rhinocoris albopilosus* showed a separate flagellate, *Crithidia vacuolata* n. sp. In one specimen of *Cosmolestes pictus* a Leptomonas was found.

Among phytophagous Hemiptera, a Leptomonas was found in the gut of *Serinetha fraterna*. This flagellate is figured, and is named *L. serinethae*. A Leptomonas from *Serinetha amicta* is also figured, and another one from *Cletus bisbipunctatus*. A new specific name (*L. mirperi*) is given to the flagellate found in the gut of *Mirperus jaculus*, and there are figures of the parasite. A Crithidia from the gut of a larva of *Pirrhocorides* is figured.

A long description is given of *Crithidia pangoniae* (see this *Bulletin*, Vol. 2, p. 51). *Crithidia tenuis*, from the gut of *Chrysozona vanden brandeni*, n. sp., is described and figured.

Chapter V deals chiefly with Haemosporidia. The work has already been summarized in this *Bulletin*, Vol. 2, p. 259. [See also this *Bulletin*, Vol. 1, p. 125, for remarks on *Trypanosoma denysi*.]

H. B. F.

Minchin (E. A.) **Report of the Professor of Protozoology at the University of London for the Year ending June 30th, 1913.**—Report to the Advisory Committee for the Tropical Diseases Research Fund. Received in Colonial Office, Aug. 20, 1913.

The Report contains an account of the personal investigations and teaching of the Professor of Protozoology, and of the investigations of those working in his department.

Professor Minchin and Dr. J. D. Thomson have continued their work on *Trypanosoma lewisi*. By a number of ingenious experiments they have shown that their previous opinion that in transmission "the trypanosome was regurgitated forward from the stomach of the flea, through the proboscis, and entered the rat by inoculation through the skin," is not supported, but that Nöller's conclusion, supported by Wenyon, that the rat becomes infected by licking the faeces of the rat flea, containing *T. lewisi*, off the skin, is accurate. They also show that the infection does not pass directly through the skin of the rat from faeces deposited upon it. Further experiments showed that "a rat can only be infected through having eaten an infected flea, if the developmental cycle of the trypanosome has been completed in the flea."

Various workers have been engaged in the study of technique and in research on various subjects during the year, the research comprising work on Kurloff bodies, protozoa of the soil, and *Toxoplasma gondii*. A brief résumé of Miss PIXELL's work on the latter organism is given. [This paper has now been published, and is reviewed below.]

Dr. WOODCOCK contributes a notice of his work on *Selenomastix* from the rumen of the goat, this being the organism recorded by CERTES, and regarded by him as representing a flagellate of the genus *Ancyromonas*. Oval and crescentic forms were found. The crescentic organism has always a homogeneous appearance, it possesses a single flagellum, and "there is no properly constituted nucleus," granules of chromatin only occurring. Oval forms are without flagella. The affinities of the organism are uncertain.

Parasites of the genus *Bodo* (in the wide sense) also were examined in cultures of goat dung. *Crithidia fasciculata* from *Culex pipiens* were examined, but no evidence was obtained that they were other than natural parasites of the gnat. Larvae of the gnat were uninfected. The author makes a number of "suppositions" as to the Haemoflagellate origin of the Crithidia.

Work on the transmission of blood parasites of the chaffinch, by the agency of bird fleas (*Ceratophyllus gallinae*), has continued to yield negative results. *Halteridium fringillae* is rapidly digested in the flea's stomach. More work on the subject is in progress.

H. B. F.

VISENTINI (Arrigo). **Gli Emoparassiti della Talpa in Italia.** [Blood Parasites of the Mole in Italy.]—*Arch. f. Protistenkunde*. 1913. Dec. 11. Vol. 32. No. 2. pp. 257–266. With 1 coloured plate.

The author's investigations were made on moles in Northern Italy, during springtime. Thirty per cent. of the moles were parasitised by *Trypanosoma talpae*, and 4·34 per cent. by *Elleipsisoma thomsoni*. Visentini found these parasites to possess the same morphological characters as previously described by J. D. THOMSON and FRANÇA respectively. He also found that co-existent with the trypanosome there were endoglobular vermicular parasites, analogous to those described by WRUBLEWSKI in Russia as *Elleipsisoma*, but which, in Visentini's opinion, were somewhat different.

The author also observed red corpuscles containing minute bacilliform or diplococcoid structures, the *Grahamella talpae* of BRUMPT, the parasitic nature of which is still uncertain.

H. B. F.

NÖLLER (W.). **Die Blutprotozoen des Wasserfrosches und ihre Uebertragung.** [Blood Protozoa of Water-Frogs and their Transmission.]—*Arch. f. Protistenkunde*, 1913. Oct. 10. Vol. 31. No. 2. pp. 169–240. With 3 plates & 5 text figs.

A preliminary account of some of these researches was reviewed in this *Bulletin*, Vol. 1, p. 497.

The author notes the various worms found in the common water-frog, and describes several blood protozoa also occurring therein. The Protozoa include:—*Trypanosoma rotatorium*, which is transmitted especially from tadpole to tadpole by *Hemiclepsis*. The form

of the parasite in the tadpole is slightly different from that in the adult frog. In transmission the incubation period is from five to six days, and the first trypanosomes are few in number, and are small. Nöller distinguishes three types in the frog's blood: (i) tadpole type; (ii) thick, large forms; (iii) forms with elongate, spindle-shaped nuclei. Cultures were made on sheep-blood-agar and subcultures in the condensation water of blood-agar and blood-bouillon. The author also discusses what physiological, physical and chemical factors determine the growth and form of the trypanosome. He considers that *T. costatum*, *T. loricatum*, *T. hylae*, *T. mega*, and *T. chattoni* are synonyms for *T. rotatorium*, while *T. elegans*, *T. undulans*, and *T. hendersoni*, are synonymous with *T. inopinatum*.

Dactylosoma ranarum is also considered, the author describing the appearance of the living organism, the growing and ripe schizonts, and forms which perhaps represent gamete formation.

Lankesterella minima, Chaussat 1850, emend. Hintze 1902, was also found. As synonyms, Nöller places *Anguillula minima*, *Drepanidium ranarum* Lankester, *Drepanidium princeps*, *Drepanidio piccolo*, *Lankesterella ranarum* and *Haemogregarina minima*. The ordinary growing forms were chiefly seen. Schizogony was uncommon, and was seen only in macrophages, endothelial cells or within internal organs (spleen and liver). *Hemiclepsis marginata* was shown to contain parasites in its stomach on the first day after feeding, and from the fourth day in the gut epithelium. The author also notes that *Isospora lieberkühni* and *Eimeria prevoti* may occur in frogs. The three plates depict stages of the organisms described.

H. B. F.

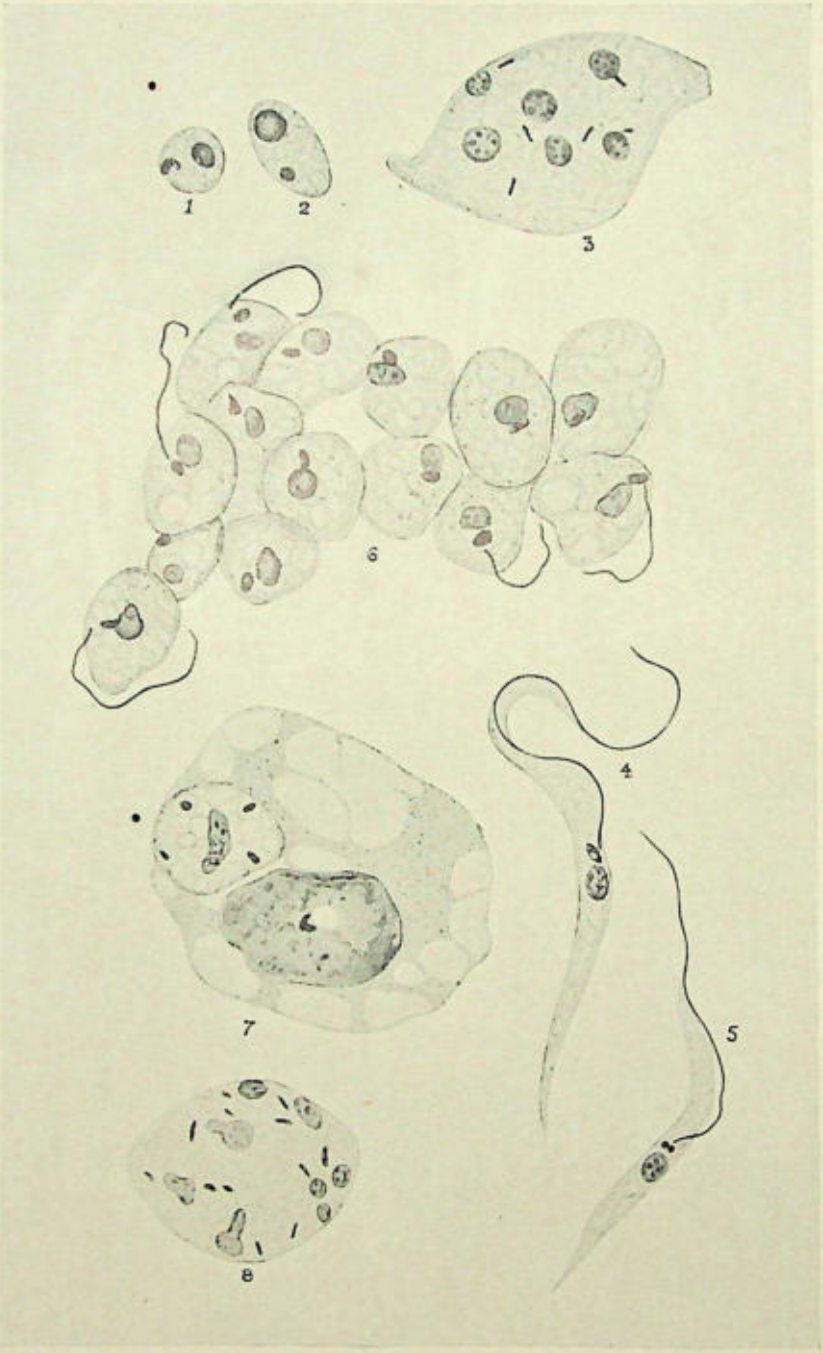
Laveran (A.) & Franchini (G.). **Infections expérimentales de Mammifères par des Flagellés du Tube digestif de *Ctenocephalus canis* et d'*Anopheles maculipennis*.**—*Compt. Rend. Acad. Sciences.* 1913. Nov. 4. Vol. 157. No. 18. pp. 744–747.

The experiments detailed in the paper were in continuation of those reviewed in this *Bulletin*, Vol. 2, p. 463.

(1) The authors succeeded in infecting several mice, a white rat and a dog with *Herpetomonas ctenocephali*. Five mice, inoculated either intraperitoneally or subcutaneously with the contents of parasitised dog fleas, became infected. Nine mice, inoculated intravenously or intraperitoneally, or with blood from the liver or spleen of infected mice, became infected—in five cases from the first passage, in two cases from the second passage, and in two other cases from the third passage. Seven of the mice died naturally, or were killed when very ill. The Herpetomonas is, then, pathogenic to the mouse. The duration of the disease in mice varied from 24 to 123 days, average 61 days. The spleen was often a little hypertrophied. Flagellate forms of the parasite were very rare in the inoculated mice, leishmania forms were common. The parasites were most numerous in the liver.

The white rat was inoculated with heart blood from an infected mouse. Two months after, leishmaniform elements were seen in the peripheral blood.

The dog was inoculated twice intraperitoneally with liver and spleen emulsion of an infected mouse, and a third time, intravenously, with



Crithidia hyalommae.

EXPLANATION OF PLATE.

The figures in the original plates were outlined with the Abbé-Zeiss camera lucida, after magnification with a 2 mm. apochromatic objective (Zeiss) with No. 12 compensating ocular.

The magnification is approximately 2,000 diameters.

FIGS. 1-2.—Early pre-flagellate forms of *Crithidia hyalommae* from the haemocoelic fluid.

FIG. 3.—Plasmodial form from haemocoelic fluid.

FIG. 4.—Fully grown Crithidia from haemocoelic fluid showing rod-shaped blepharoplast.

FIG. 5.—Commencing division of blepharoplast: diplosome blepharoplast shown.

FIG. 6.—Shows aggregation rosette of ovarian stages in walls of oviduct.

FIG. 7.—Resting and division stages in ovarian cell.

FIG. 8.—Plasmodial form in deposited ovum.

(Redrawn from Captain W.R. O'FARRELL's Plates.)

infected mouse-blood. It died 50 days after the first inoculation. Leishmaniform elements were found in the liver, spleen, axillary glands, and bone marrow.

Two Macacus monkeys inoculated subcutaneously have not yet shown infection.

(2) Experiments with *Crithidia fasciculata*, from the digestive tract of *Anopheles maculipennis*.

Two white rats and three white mice were inoculated with the contents of ten parasitised Anopheles. The two rats and two of the mice became infected. The rats were inoculated intraperitoneally and died in about a month, leishmaniform parasites occurring in them.

The mice were inoculated intraperitoneally, two directly from Anopheles, and one from one of the rats above-mentioned. The last-mentioned mouse died in 12 days. Leishmaniform parasites were seen in all the inoculated mice. Hence *Crithidia fasciculata* can produce infections in rats and mice.

In all the animals successfully infected, leishmaniform elements were found in the peripheral blood, liver and spleen. Flagellate forms of *Crithidia fasciculata* were never seen in the inoculated vertebrates.

H. B. F.

O'Farrell (W. R.). **Hereditary Infection, with Special Reference to its Occurrence in *Hyalomma aegyptium* infected with *Crithidia hyalommae*.**—*Ann. Trop. Med. & Parasitol.* 1913. Dec. 30. Vol. 7. No. 4. pp. 545–562. With 3 plates.

A short review of O'Farrell's preliminary note on *Crithidia hyalommae* stated that the full paper would be awaited with interest (this *Bulletin*, Vol. 2, p. 465.) The present paper amply fulfils the expectation. The author describes and illustrates very fully the phases of the Crithidia found in the haemocoelic fluid and ovarian tract of *Hyalomma aegyptium*, the common cattle tick of the Anglo-Egyptian Sudan. The preflagellate stage of the Crithidia is of short duration. The parasites are oval or rounded bodies, 4μ to 11μ broad. Division occurs among them. The flagellates vary from 26μ to 50μ in length, and from 2μ to 2·5μ in breadth. The blepharoplast is in the immediate neighbourhood of the nucleus. The postflagellate and ovarian stages occur in the haemocoelic fluid, ovary and oviducts.

About the time of oviposition, and during this event, the flagellates pass by means of the haemocoelic fluid to the ovary and oviducts. A large number of them enter (by their non-flagellar ends) the walls and cells of these organs. There the flagella are absorbed and a Leishmania-like form is assumed. A considerable number of parasites pierce the walls of the ova, more than one parasite often entering the same ovum. Once within the egg, the Leishmania-like form is produced. Subsequently division of the parasite occurs so that large "plasmodial" forms are found. These ultimately break up into smaller resting bodies. All stages in this division have been followed. The resting (post-flagellate) forms occur most frequently in the later deposited ova, while the ova deposited early in oviposition are usually uninfected. Many of the ova of infected ticks dry up and die.

The infection of *Hyalomma aegyptium* by *Crithidia hyalommae* is

purely an hereditary infection, and the Crithidia is a strictly parasitic flagellate of the tick. The author clearly showed this, as attempts at cultivation of the flagellates and cultures of the blood of cattle harbouring ticks, as well as experimental inoculations of cattle with the flagellates, all gave negative results.

The paper is well illustrated by three plates depicting all the phases described.

[The mode of hereditary infection of *Hyalomma aegyptium* by *C. hyalommae*, as described by the present author, is thus on the same lines as that of *Melophagus ovinus* by *C. melophagia*, as described by PORTER (1910), to whose work O'Farrell refers. It also emphasizes the need of research on haemocoelic and ovarian infections by flagellates, especially those of insects suspected of spreading disease.]

H. B. F.

FANTHAM (H. B.) & PORTER (Annie). *Herpetomonas stratiomyiae* **n. sp., a Flagellate Parasite of the Flies,** *Stratiomyia chameleon* **and** *S. potamida*, **with Remarks on the Biology of the Hosts.** —*Annals. Trop. Med. & Parasit.* 1913. Dec. 30. Vol. 7. No. 4. pp. 609–620. With 1 plate.

The special interest of the paper lies in the tracing of the developmental stages of *Herpetomonas stratiomyiae* through the metamorphosis of the insect hosts, *Stratiomyia chameleon* and *S. potamida*. Larvae, pupae and imagines are infected. Preflagellate, flagellate, and post-flagellate stages occur in the gut of the larvae.

Just prior to pupation, the flagellates migrate from the gut of the larva into the haemocoel, where they gradually become motionless, withdraw their flagella, and assume the post-flagellate form. They collect in the more fluid parts of the body of the pupa, and, ultimately, as a result of this, they become enclosed in the gut of the adult.

The imago, if formed from an infected pupa, usually emerges from the pupa case infected with non-flagellate forms of the herpetomonad. The development of the non-flagellate into the flagellate form is rapid, and soon all stages of the organism are present.

Infection of the larvae is contaminative, that of the pupa is transmitted from the larva, while the imago may retain the pupal infection or may possibly acquire it *ab initio*, by ingesting contaminated food.

It is suggested that the coincident cyclical development of the flagellate parasite and the insect host may be of practical application in the study of "leishmaniasis in the making," as recently described by LAVERAN and FRANCHINI (see this *Bulletin*, Vol. 2, p. 463, and above.)

W. Yorke.

von RÁTZ (Stephan). **Trichomonas aus der Leber der Tauben.** [Trichomonas from the Liver of Pigeons.]—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Oct. 4. Vol. 71. Nos. 2/3. pp. 184–189.

The author gives first a resumé of the literature relating more especially to the Trichomonas found in pigeons, and then a short account of his own investigations. The birds affected were chiefly young ones. The liver was enlarged and adherent to the stomach-wall. The capsule of the liver was greyish or canary yellow. The surface of this organ was mottled and uneven, cheesy areas being

present in section. The cheesy masses contained numerous flagellates, showing vigorous movements. The parasites were mostly pyriform, or oval, the posterior end often rounded. At the anterior pole three flagella arose, and an undulating membrane was present. The body of the flagellate is colourless, with granular protoplasm. The blepharoplast is distinct. The nucleus is a somewhat elongate oval, and round vacuoles are present. The diameter of the roundish forms reaches 8·4*μ*. The exact method of infection of the liver was not ascertained.

Trichomonas columbae is considered to be a facultative parasite which, under certain circumstances, occurs in the gut, and can pass thence into the liver substance, either through the gut-wall, or by way of the bile duct.

H. B. F.

Gelei (J.). **Bau, Teilung und Infektionsverhältnisse von *Trypanoplasma dendrocoeli* Fantham.**—*Arch. f. Protistenkunde.* 1913. Nov. 11. Vol. 32. No. 1. pp. 171-204. With 1 plate and 1 text-fig.

The author, whilst engaged in ovogenetic studies on the flatworm, *Dendrocoelum lacteum*, found the flagellate, *Trypanoplasma dendrocoeli*, first recorded and described by Fantham and Porter jointly. [Not, as in the title, by one of these authors. See *Proc. Zool. Soc. Lond.*, 1910, p. 670.] He gives an account of the movements and structure of the parasite, which agrees in all essentials with the original account. The division of the nucleus, blepharoplast and flagellum is described. The author claims as an important part of his research the establishment of an intracellular stage of *T. dendrocoeli*. [Fantham and Porter found such intracellular stages in the ovary and eggs of the Dendrocoels.] Gelei has found intracellular forms in phagocytic gut cells, in epithelial pits of the pharynx, in non-epithelial pharynx tissue and in the epithelial tissue of the bursa copulatrix, vagina, large cells of oviduct, seminal tube and penis. Hereditary infection was not found. Infection of the host is stated to occur during coitus.

H. B. F.

Lewin (Kenneth R.). **The Nuclear Structure and the Sporulation of *Agrippina bona* Strickland.**—*Parasitology.* 1913. Oct. Vol. 6. No. 3. pp. 257–264. With 1 plate and 8 text figs.

The author gives an account of the nuclear structure of the trophozoite, the nuclear changes in the cyst, the formation of gametes, zygosis and the spores of the gregarine, *Agrippina bona*, parasitic in the gut of the larva of the rat-flea, *Ceratophyllus fasciatus*. There is a slight difference between the gametes formed by the two individuals associated in a cyst, but both sorts of gametes are non-motile. In conclusion, the author adopts Strickland's view and for the present regards "*Agrippina* as the representative of a new family of Gregarines." The paper is illustrated by a plate of 15 figures. [It is to be regretted that the magnifications of these figures are not stated.]

H. B. F.

WALKER (J.). **A Short Note on the Occurrence of a Leucocytozoon Infection. Host the Ostrich.**—*Union of S. Africa, Dept. of Agriculture. Second Report of the Director of Veterinary Research*, 1912. Oct. pp. 384–386. With 2 plates. (1913, Cape Times, Ltd., Govt. Printers.)

The parasite, a Leucocytozoon, was found in the blood when the author was examining ostrich chicks in the Middelburg district, Cape Province. The blood smears used were dried, fixed in alcohol and stained with Giemsa. Male and female gametocytes were found, the female parasites being the more numerous. The shape of the parasite varies; it is usually more or less rounded. The size varies from 11 to 15μ by 9 to 13μ. The protoplasm of the female gametocyte stains more deeply than that of the male. The nucleus of the male is more scattered than that of the female. Generally the male parasite is the smaller in size.

The nucleus of the host cell is altered in shape, becoming elongate, and it is situate at the edge of the parasite. No spindle shaped alteration of the form of the host cell has so far been observed.

The name *Leucocytozoon struthionis* is proposed for the parasite.

The two plates illustrating the paper are reproductions of photographs of blood smears, but, unfortunately, they are not very clear or detailed.

H. B. F.

HENRY (Herbert). **A Consideration of the Infective Granule in the Life History of Protist Organisms.**—*Jl. Pathology & Bacteriology.* 1913. Oct. Vol. 18. No. 2. pp. 250–258.

This paper gives a somewhat diffuse history of the phenomena of "granule shedding" as observed by many workers on various Protozoa. The author then discusses the two main hypotheses with regard to these granular products, namely, that they are degeneration products or that they are essential features in the life-history of the organisms concerned. An interesting speculation as to the existence of a "primordial chromatin granule" and its subsequent "acquisition of protoplasm," with a possible application to the "classification of the Haemosporidia" "on phylogenetic principles," concludes the article.

The author mentions in the course of the paper granule-shedding in trypanosomes and *Leishmania*, coccoid bodies in spirochaetes, *Anaplasma*, *Grahamella* and *Haemogregarina simondi*.

H. B. F.

HENRY (Herbert). **The Granule Shedding of *Haemogregarina simondi*.**—*Jl. Pathology & Bacteriology.* 1913. Oct. Vol. 18. No. 2. pp. 240–249. With 3 plates.

The author discusses the structure of *Haemogregarina simondi* in the sole, and deals more particularly with the extrusion of granules from the nucleus in the living organism and with the appearance of the same as seen in fixed and stained preparations. The paper thus covers much the same ground as one previously reviewed (see this *Bulletin*, Vol. 1, p. 264). In the final discussion, the author states that "in considering the nature of any chromatin-like granule occurring in a

Protozoon one must bear in mind . . . A.—In the first place, it may be something other than chromatin," *e.g.* volutin or a centrosome. . . . "B.—A free chromatin granule in the cytoplasm of a protozoon may be (1) a kineto-nucleus . . . (2) a karyosome . . . . (3) a chromidial granule, using the term in its widest sense."

H. B. F.

PIXELL (Helen L. M.). **Notes on *Toxoplasma gondii*.**—*Proc. Roy. Soc.* 1913. Oct. 1. Series B. Vol. 87. No. B592. pp. 67–77. With 1 plate.

The paper first gives a general account of *Toxoplasma gondii*, in which the work of previous authors is mentioned. A section then deals with the distribution of the parasite in the host, and covers much the same ground as was reviewed recently in this *Bulletin* [vol. 2, pp. 259-261.] In addition, pavement epithelial cells of the omentum were found to be parasitised, as was also the subserous areolar tissue. The general effects of *T. gondii* on mice agree with those obtained by previous workers. Wet and dry methods of fixation were used, and the ordinary stains either alone or in combination were employed.

Details regarding the movements of the parasite are somewhat vague. Refringent granules were seen in some living specimens. The nucleus is usually vesicular with a karyosome. The refringent granules stain like chromatin, and are thought to be " of the nature of reserve chromatin, or volutin." The spaces around the parasites when enclosed in host cells are indicative of a destructive liquefying action of the parasite on the protoplasm of the host cell.

Multiplication by longitudinal division is described, and multiple division (schizogony) was seen.

Attempts at cultivation gave negative results.

The author confirms the statements of NICOLLE and COYOR that Toxoplasma causes a seasonal disease in the gondi. The paper is illustrated by a plate of 25 figures.

H. B. F.

CARINI (A.) & MACIEL (J.). **Toxoplasmose naturelle du Chien.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 681–683.

In the first part of the paper the authors state that they have now come to the conclusion that the Toxoplasma of European and American dogs is identical. They then proceed to record their recent researches at Sao Paulo, Brazil.

Two young dogs, infected naturally with toxoplasma, showed post mortem a clear serous exudate in the abdominal and thoracic cavities. The lungs were pneumonic, the liver and kidneys very hyperaemic. Toxoplasma were especially numerous in the lungs. An emulsion of the organs of each of these dogs injected into other young dogs and pigeons reproduced the disease. Young dogs contracted a severe infection that killed them in eight to twelve days. Adult dogs were more resistant, even though larger quantities of virus were employed. The inoculated pigeons died in twelve to nineteen days, as if they had been infected with *T. cuniculi*. The pigeons showed

a rather marked oedema of the eyelids and cloaca, with numerous toxoplasms occurring in the oedematous tissues.

In dogs and pigeons dead of toxoplasmosis, whether acquired naturally or artificially, neither morphologically nor pathogenically was it possible to differentiate between *Toxoplasma canis*, *T. cuniculi* and *T. columbae*, which makes it very doubtful whether they should be considered as distinct species. The authors conclude that one toxoplasm only produces the natural infection of dogs, rabbits and pigeons.

H. B. F.

Fantham (H. B.) & Porter (Annie). **The Pathogenicity of *Nosema apis* to Insects other than Hive Bees.**—*Annals Trop. Med. & Parasit.* 1913. Dec. 30. Vol. 7. No. 4. pp. 569–579.

The paper contains an account of the pathogenic effects of *Nosema apis*, the parasite of "Isle of Wight" disease in bees, on various Hymenoptera, Lepidoptera and Diptera. Many of the experiments were suggested or based on natural infections observed in the open. *Nosema apis* produced great effects in most of the insects used.

The authors' summary and conclusions are as follows :—

"11.—*Nosema apis* has been proved pathogenic to Hymenoptera other than bees. It can multiply in the food canals of humble bees, mason bees and wasps, and can bring about the deaths of the hosts.

"12.—Contamination of plants with infected excrement occurs in the neighbourhood of badly infected hives. Such contaminated food is pathogenic to the larvae of cabbage white butterflies, cinnabar moths, and gooseberry moths, in which *Nosema apis* produces destruction of the tissue of the food canal in the same way as in bees. Both imagines and larvae of these insects became infected with microsporidiosis when supplied with food contaminated with Nosema spores.

"13.—*Calliphora erythrocephala*. The blow fly becomes infected naturally by ingesting Nosema spores contained in the sweet excrement of bees. This infection has been repeated experimentally. Crane flies may also become infected.

"14.—A member of the Hippoboscidae, *Melophagus ovinus*, has been infected successfully with *Nosema apis*, which is pathogenic to the sheep ked. It is suggested that research be made by competent observers among the Glossinae for Microsporidian parasites allied to the Nosema of bees, and, possibly, equally pathogenic to the tsetse flies that may harbour them."

[The morphology, life-cycle, modes of infection and pathogenicity of *Nosema apis* in bees were summarised in this *Bulletin*, Vol. 1, pp. 156–157.]

W. Y.

Miyaji (S.). **Zur Frage nach der Natur der Kurloffschen Körperchen.** [On the Nature of the Kurloff Bodies.]—*Centralbl. f. Bakt.* 1. Abt., 1. Orig. 1913. Oct. 4. Vol. 71. Nos. 2/3. pp. 189–198. With 2 coloured plates.

The author reviews critically the results of the work of previous investigators on Kurloff bodies and experimentally tests their results. Miyaji examined 151 guinea-pigs, of which 57 were adult males, 66 adult females (of which 13 were pregnant), 10 young males and 18 young females. Twenty-six embryos were also examined. Kurloff bodies occurred in 48 females and 25 males. Gravid and puerperal guinea-pigs always contained them. Young animals and embryos did not contain them, and they were rarely obtained from placentae.

Many stains were used on dry and wet fixed films, and "jelly" methods of investigation were employed. The result was to show that the constitution of the "nuclear" apparatus of a Kurloff body varied both in extent and composition according to the stain employed. No spirochaetes were observed within the Kurloff bodies when investigated by dark ground illumination. Spleen emulsion and blood from freshly dead gravid guinea-pigs, containing numerous Kurloff bodies, were used for inoculation, but two months' observation has so far given negative results.

Miyaji does not regard the Kurloff bodies as parasites. He has very seldom found structures which could be considered as intracorpuscular or free spirochaetes. Microscopic appearances after vital staining show structures more or less like the initial bodies, elementary bodies, etc. of Chlamydozoan enclosures, resembling them in their variability of colouring, the lack of knowledge of their transmissibility and the negative statements regarding the body contents in natural situations with vital colouring. The Kurloff bodies appear to be vacuole-like structures in leucocytes, which are capable of spontaneous development at certain periods in the sexual life of the host.

H. B. F.

i. Pappenheim (A.). **Ueber neure Feststellungen zur Natur der sog. Kurloffkörper in den grossen Lymphozyten des Meerschweinchen-blutes.**—*Folia Haematologica.* 1913. Dec. Vol. 17. No. 2. pp. 183–190.

ii. Schulhof (Kamil). **Studien über die Kurloffkörper nebst Beiträgen zur vergleichenden Hämatologie.**—*Folia Haematologica.* 1913. Dec. Vol. 17. No. 2. pp. 191–210.

i. Pappenheim reviews first the many suggestions made as to the nature of the Kurloff bodies in guinea-pigs. Two main views are discussed:—(*a*) That the Kurloff bodies are either parasites or plasmatic-plastinoid reaction products due to an invisible virus or hormone. (*b*) That they are mere autogenous, fluid, cell secretions. The present paper deals mostly with the morphological aspect of the bodies under various conditions. They are structureless and homogeneous in unstained preparations. In fixed and stained preparations their structure varies according to the reagents used. The author considers that the Kurloff bodies are of the nature of a secretion, and he mentions their transmutation into and analogy with azur grains. The bodies occur only in the genus *Cavia*.

ii. Schulhof concludes that the Kurloff bodies are physiological structures and not of a pathological nature. He does not believe that they are Chlamydozoa. There is no evidence of a preformed structure; they are homogeneous. The author concludes with a summary of the various peculiar granulations observed in the blood elements of many animals that he has examined.

H. B. F.

KALA AZAR.

LAVERAN (A.). i. **Kala Azar Méditerranéen et Kala Azar Indien.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 574–579.

ii. **Les Macaques et les Chiens sont Sensibles au Kala Azar Indien comme au Kala Azar Méditerranéen.**—*Compt. Rend. Acad. Sciences.* 1913. Nov. 17. Vol. 157. No. 20. pp. 898–901.

i. This paper is mostly a resumé of the author's (and C. NICOLLE's) address before the International Congress of Medicine. Here again the author insists that the differences which were supposed to exist between the Indian and Mediterranean kala azar have gradually been disproved. He enumerates the successful inoculations which have been made with the virus of Indian kala azar. ROW has produced a local lesion in three *Macacus sinicus*, a general infection in a fourth monkey of the same species, and a general infection in two white mice; DONOVAN has successfully inoculated a young dog, while PATTON has infected four *Macacus sinicus*, four dogs, one jackal and one white rat, and MACKIE one white mouse, one *Macacus rhesus* and two flying squirrels (*Galeopithecus volans*).

ii. Cultures of *Leishmania donovani* were obtained from Dr. ROW in Bombay, and were maintained at the Pasteur Institute, Paris on NNN medium. Two *Macacus sinicus* were inoculated intrahepatically with the cultures. One of these was again inoculated 50 days later. It died three months after the first inoculation. Very scanty leishmania were found in the smears of the spleen and marrow, and from this a culture was obtained. The second of the monkeys received a second injection 70 days after the first, and a third injection 42 days later. The monkey died five months from the date of the first injection. There was a heavy infection of the liver, spleen, and bone marrow.

Nine young dogs were inoculated either intrahepatically or intravenously with cultures. Of these only three contracted infection, mild in each case. The results obtained by the author with the Indian virus are similar to those obtained with the virus of Mediterranean kala azar, so that he believes it is no longer possible to doubt the identity of the two diseases.

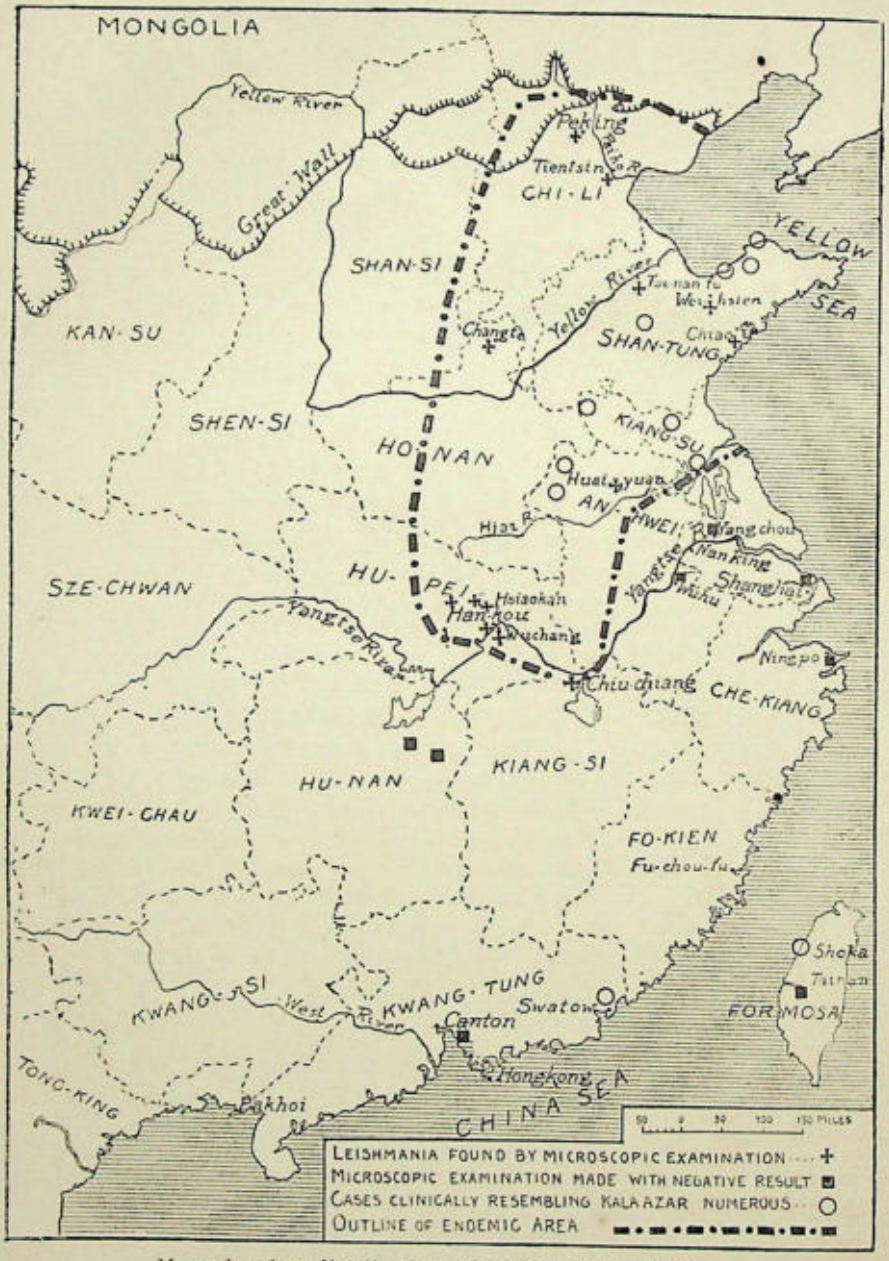
C. M. Wenyon.

COCHRAN (S.). **The Superficial Lymph Nodes as a Source of Leishmania for the Diagnosis of Kala Azar; with some Observations on Kala Azar in China.**—*Jl. London School Trop. Med.* 1913. Nov. Vol. 2. Pt. 3. pp. 179–195. With 1 map and 1 fig.

The author has endeavoured by means of a circular letter to obtain information on the distribution of kala azar in China. He finds that all reports of the finding of leishmania come from places north of the Yangtze River, with the exception of Wuchang and Kiukiang, which are on that river. All the negative examinations were made in places south of the river, with the exception of Yangchou, which is a few

miles north of the river. The information collected is illustrated by a map, which is here reproduced in part.

Writing of kala azar in his own district of Hwaiyan, the author



Map showing distribution of Kala Azar in China.

states that undoubtedly the great majority of cases of splenomegaly seen are cases of kala azar. In the two years, June 1st, 1910 to June 1st, 1912, of 8,058 patients seen in out-patient practice 83 are

recorded as kala azar or splenomegaly. As regards the age of these patients the following table is given :—

		Per cent.
1–10 years	27	32·6
10–20 „	24	29
21–30 „	18	21·6
31–40 „	11	13·2
41–50 „	3	3·6
	83	100

The oldest patient was 50 years, and the youngest two years. A positive diagnosis by the finding of leishmania was made in 20, and in 16 of these the average age was 16·8 years, the youngest being four years old and the oldest 35. In other parts of China where the parasite has been found, the result has been as follows :—

Hankow.—AIRD and THOMSON's cases were adults.

Ksiaokan.—One patient of 22 and one of 57.

Weihsien.—Mostly children, though adult cases not uncommon.

Tsinan.—Children and adults.

Changte, Honan.—LESLIE's cases were all children.

Pekin.—ASPLAND's cases were all children.

The author writes that it is evident the disease is not kala azar infantum, and thinks that there is hardly sufficient evidence to warrant dividing the disease anywhere into two separate entities.

As regards the sex of the 83 cases only four were females, but this is due in some degree at least to the fact that males mostly apply for treatment. The average duration in 28 cases was 12·8 months, the shortest being four months, and the longest five- six years. Only one fatal case had lasted over twelve months. There is a tendency for the disease to spread amongst members of one family. The symptoms of disease as it exists in China do not differ from those elsewhere. It is reported that in every case examined the inguinal glands have been more or less enlarged. As regards other glands there has been much variation.

The various methods of diagnosis are discussed in detail, and the author again advocates the excision of a superficial lymphatic gland for this purpose. This is done under local anaesthesia, and the removed gland is cut into two pieces and smears made directly from the cut surface. Puncture of the gland without excision has not given such good results.

In the table are set forth the gland examinations made in 20 cases, and the time which was required to establish a diagnosis by examination of the stained films.

Case.	Source.	Time of Search. Smears.		Puncture.
I.	Post-cervical	Every field	——	Negative
II.	Post-cervical	5 min.	——	Not successful. No fluid drawn
III.	——	25 ,,	——	Not attempted
IV.	——	5 ,,	——	,, ,,
V.	——	5 ,,	Very abundant	,, ,,
VI.	Post-cervical	2 ,,	——	,, ,,
VII.	Post-cervical	2 ,,	——	Positive, 10 min.
VIII.	——	½ ,,	——	Negative
IX.	Inguinal	20 ,,	——	,,
X.	Inguinal	4 ,,	Scanty	Not attempted
XI.	Inguinal	8 ,,	Scanty	Positive, 12 min.
XII.	Inguinal	2 hrs.*	Negative	Positive, 40 min.
XIII.	Inguinal	3 min.	——	Puncture unsatisfactory.
XIV.	Inguinal	3 ,,	——	Not made
XV.	Inguinal	3 hrs.	Negative	,, ,, †
XVI.	Inguinal	135 min.	——	Unsatisfactory
XVII.	Inguinal	2 hrs.	One degenerating parasite	Positive, 40 min. Typical parasite
XVIII.	Inguinal	65 min.	——	Negative. One hour search.
XIX.	Inguinal	12 ,,	——	Not made
XX.	Inguinal	1 ,,	——	Negative. ½-hour search

As regards prognosis and treatment little can be said, as the patients are rarely willing to remain in hospital for any length of time.

C. M. W.

BASSETT-SMITH (P. W.). **Kala Azar in an Adult from Malta.**—*Jl. R. Army Med. Corps.* 1913. Nov. 1. Vol. 21. No. 5. pp. 581–582. With 1 text fig.

The case described is one of a man aged 29 in the Royal Navy who, without doubt, contracted the disease while stationed on shore in Malta. Spleen puncture had been performed once by Surgeon A. V. N. RICHARDSON, R.N., who first discovered leishmania in the case, and liver puncture four times by the author who discovered parasites on each occasion, though at the last puncture they were very scarce. Cultures have been obtained on NNN medium.

C. M. W.

LO RE (Mariano) & de STEFANO (Silvio). **Sopra Otto Casi di Anemia da Leishmania.**—*Gaz. Internaz. d. Med. Chirurg. Igiene.* 1913. Dec. 6. No. 49. pp. 1157–1161.

An account of eight cases of infantile kala azar, seen in the clinic at the University of Naples. The ages of the children varied from 13

* This case showed parasites in a gland-smear some weeks later.
† Further examination would have been made in this case but for his refusing to stay in the hospital.

months to six years, and they came from the following localities: (1) S. Lucido, in the province of Cosenza; (2) Capaccio in Salerno; (3) Piazzolla di Nola in Caserta; and the remaining five from villages round Vesuvius.

C. M. W.

Spolverini (L. M.). **Contributo allo Studio della Leishmaniosi infantum.**—*Pediatria.* 1 13. Sept. 30. Vol. 21. No. 9. pp. 659–668.

A description of two cases of infantile kala azar, one from Roccasecca (Caserta), and the other from Algeria, seen by the author in Rome.

C. M. W.

Di Cristina (G.) & Caronia (G.). **Serologische Untersuchungen bei der infantilen Leishmaniosis.**—*Zeitschr. f. Kinderheilk.* Orig. 1913. Nov. 15. Vol. 9. No. 2. pp. 128–146. **Ricerche Serologiche nella Leishmaniosi infantile.**—*Pediatria.* 1913. Nov. 30. Vol. 21. No. 11. pp. 801–817.

Caronia (G.). **Agglutinine e Precipitine Specifiche nella Leishmaniosi Infantile.**—*Pediatria.* 1913. Sept. 30. Vol. 21. No. 9. pp. 641-644. **Spezifische Agglutinine und Präzipitine bei der infantilen Leishmaniosis.**—*Zeitschr f. Immunitätsforsch. u. Experiment. Therapie.* 1. Teil. Orig. 1913. Nov. 24. Vol. 20. Nos. 1/2. pp. 174–177.

These papers have to do with serological researches into infantile kala azar, and are chiefly written with a view to collecting the results obtained by the authors at the University of Palermo.

1. *Serological researches bearing on epidemiology.*

The relation of canine to infantile kala azar is discussed, and the following experiment described. A healthy child and one suffering from infantile kala azar were rendered immune to killed cultures of human leishmania, and likewise a healthy child and one with kala azar were made immune to killed cultures of canine leishmania. The serums of these four children were tested for deviation of the complement and agglutination with a definitely positive reaction in each case, confirming the results previously obtained by Baudi, who worked with rabbits, that from this point of view the canine and infantile leishmania are identical.

Investigations were undertaken with the flagellates found in fleas taken off kala azar dogs. An alcoholic extract of 200 of these fleas was made and used as antigen in testing for deviation of the complement. The result obtained did not support in any way the view that the flea flagellates are connected with the leishmania of the dog.

2. *Serological researches bearing on pathogenesis and diagnosis.*

(*a*) *Agglutination and agglutino-precipitation.*

As a result of their own observations and those of other observers, the authors conclude that agglutinins and specific precipitins only rarely are produced in any quantity in the blood as the result of the natural leishmania infection, but that it is possible to produce them artificially by the injection of killed parasites or of nucleo-proteids extracted from these.

(*b*). *Specific amboceptors.*

The reaction for deviation of the complement has been tried in 88 cases of infantile kala azar, with a partially or definitely positive result in 13 cases. The authors conclude therefore, that the leishmania act like other microorganisms, in that they stimulate the body by means of toxins and endotoxins to the production of antibodies. In the cases in which a positive result was obtained, the malady had only been of short duration, suggesting that there is an immunity reaction early in the disease only. In one case this disappeared after fifteen days.

(*c*). *The strength of complement.*

There is a constant increase in the power of the complement towards the later stages of the disease (see this *Bulletin*, Vol. 2, p. 438).

(*d*). *Allergic sero-diagnosis.*

This is a reaction that has been suggested by ASCOLTI. It depends upon the fact that a subject who has been submitted to the action of an antigen without having reacted in the production of specific antibodies, may be artificially stimulated with small doses of the same antigen (killed cultures, toxins, &c.), so that he acquires the power of forming these antibodies, and they are produced in him more quickly than in a subject who has not previously been submitted to the action of the antigen. ASCOLTI has found this reaction to apply to certain cases of undulant fever which have failed to produce antibodies as a result of natural infection. In the case of kala azar, two patients were taken in whose blood no antibodies could be detected. These, with two healthy children, were treated with nucleo-proteids extracted from cultures of leishmania. In all four the reactions for deviation of the complement and agglutination appeared on the fifth or sixth day, so that there was practically no difference noted between the infected and healthy children.

(*e*). *Skin-reaction.*

In only one case was any skin reaction noted at the site of inoculation of cultures killed at 55°C.

(*f*). *Anaphylaxis.*

The most satisfactory test is carried out in the following manner: 2-3 c.c. of serum from a case of kala azar is mixed with 2 c.c. of culture of leishmania from NNN medium, and after having been kept at 37° C. one hour, and on ice for 24 hours, the mixture is injected intravenously into a guinea-pig which has been immunized against culture of leishmania by repeated subcutaneous injections. In eight cases of kala azar tested in this way a mild reaction was obtained in two, a more definite one in two, and a very decided one in the remaining four. With four healthy children tested as controls, the reaction was invariably negative. In the guinea pigs the reaction may be so marked as to bring about the death of the animal. [The author's original paper on this subject was reviewed in Vol. 2, p. 437 of this *Bulletin*.]

3. *Serological researches bearing on treatment.*

An earlier paper by the authors on this subject was reviewed in this *Bulletin*, Vol. 1, p. 7. No very satisfactory results have been obtained by the injection of killed cultures. Recently attempts have been made to treat cases by the injection of nucleo-proteids, extracted from cultures by the method of LUSTIG and GALEOTTI. In some

there appeared to have been a degree of improvement, but recognising the fluctuations to which this disease is liable the authors hesitate to pronounce any definite opinion.

C. M. W.

MAYER (Martin) & WERNER (Heinrich). **Kultur des Kala-Azar-Erregers (*Leishmania donovani*) aus dem peripherischen Blut des Menschen.** [Cultivation of *L. donovani* from the Peripheral Blood of Man.]—*Deut. Med. Wochenschr.* 1914. Jan. 8. Vol. 40. No. 2. pp. 67–68.

One dozen tubes of NNN medium were inoculated with three to five drops each of peripheral blood from a case of Indian kala azar, in the Institute for Tropical Diseases in Hamburg. The tubes were examined every week, and on the 29th day the eight tubes remaining uncontaminated were all found to have a growth of flagellates which were numerous in three tubes, but more scanty in the others. This is the first time that culture from the peripheral blood of man has been successful. NOVY had previously succeeded in obtaining culture from the peripheral blood of an infected dog. The authors advocate the culture test as an aid to diagnosis.

C. M. W.

GRAY (A. C. H.). **Report on some Observations made and Work done at the Pasteur Institute, Tunis.**—*Jl. R. Army Med. Corps.* 1913. Dec. Vol. 21. No. 6. pp. 696–712. With 9 figs.

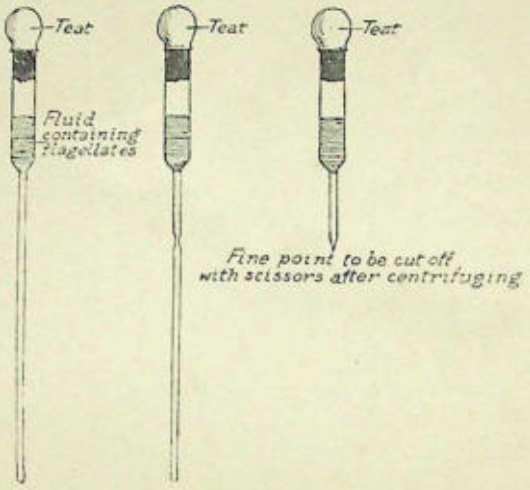
This report is mainly an account of the work which is being carried on at the Pasteur Institute in Tunis. Amongst other matter, there is mention of some observations made by the author on leishmaniasis. A description is given of NICOLLE'S method of preparation of NNN medium for the culture of flagellates. The blood for this medium is obtained by plunging the needle of the syringe into the rabbit's thorax, through the third left intercostal space at a point near the sternum, after sterilising the skin with strong iodine solution. The blood is transferred directly without defibrination to the still liquid agar in the test tubes.

An account is given of the examination of dogs for natural leishmania infections (see this *Bulletin*, Vol. 1, pp. 637-638).

A method for obtaining stained preparations of cultural forms of flagellates is given. It is described in the following words:

"An ordinary pipette is taken and sterilised in the flame. When cool, a little of the fluid at the bottom of the culture tube containing the flagellates is sucked up into the pipette, and then about three times the bulk of physiological salt solution. The culture and solution are drawn up into the wide part of the pipette and mixed. The tube is then sealed off high up close to the wide part, the sealed end being drawn into a fine point as shown. The teat is removed and the tube containing the diluted culture is centrifuged slowly for two minutes. Great care must be taken to protect the fine drawn-out bottom of the tube from breakage during the centrifuging. Practically all the cultural forms are now in the fine drawn-out point of the tube. The very tip of the tube is cut off with scissors and the drop of fluid which emerges, and which contains the parasites, is placed at one end of a clean slide. A drop of quite fresh human serum, of equal bulk, is now placed beside it; the two drops are thoroughly and rapidly

mixed and filmed out with a spreader. The film is fixed in absolute alcohol for the regulation fifteen minutes. I generally stained my films with Giemsa's stain, using a mixture of 1½ drops of the stain to every cubic centimetre of distilled water, and staining for twelve minutes only. The



action of the fresh serum on the washed flagellates causes them to take up the stain very quickly, and I found the above time ample. The films are then washed and blotted in the ordinary way."

C. M. W.

Cannata (S.). **Le Piastrine del Sangue nella Leishmaniosi Infantile.** [Blood Platelets in Infantile Leishmaniasis.]—*Pediatria.* 1913. Sept. 30. Vol. 21. No. 9. pp. 645–648.

This is an account of investigations into the number of blood platelets present in the blood of cases of infantile kala azar. In counting the platelets Helber's chamber was used. The blood was taken into a Thoma-Zeiss apparatus up to the 0.5 mark, and diluted with Deetjen's liquid, which consists of metaphosphate of soda grams 2, chloride of sodium grams 0·9, and distilled water 100 c.c. Objective 1/7 with ocular 8 was employed. In two healthy children the blood platelets numbered 275,000 and 260,000 per cmm. of blood. In 14 cases of kala azar the number varied between 187,500 and 93,740, with the exception of one of the cases in which it was as high as 327,840. In this case the examination was made early on in the disease when the general condition was very good. The lowest figure was obtained in the case of a child in a very serious condition of advanced disease.

C. M. W.

Statham (J. C. B.) & Butler (G. G.). **Note on Certain Bodies found by Liver Puncture in a Case of Fever associated with Splenic Enlargement.**—*Jl. R. Army Med. Corps.* 1913. Dec. Vol. 21. No. 6. pp. 629–635. With 1 plate.

Smallman (A. B.). **Note on Some Cellular Bodies found in a Case of Mediterranean Leishmaniasis.**—*Ibid.* pp. 636–640. With 1 plate.

The former of these two papers contains a description of certain

bodies which were seen in films made from liver puncture material from a child aged eight years, with enlarged spleen, in Freetown, West Africa. The bodies in question consist of protoplasmic masses of various sizes (3-20μ) containing chromatin staining granules, some having a diameter of 1-2μ. These bodies resemble structures described by ARCHIBALD and obtained by him from the liver of a case of Sudan kala azar. As to their nature, the authors hesitate to pronounce any definite opinion, but bring forward the suggestion that they may be schizonts of some protozoon, and may possibly have a similar relation to *Leishmania infantum* that ARCHIBALD's bodies appear to have to *L. donovani*. No leishmania, however, could be found in the case. [It is stated that ARCHIBALD showed that his bodies were convertible into Leishman-Donovan bodies when injected into a monkey. This statement is hardly accurate. ARCHIBALD could find no leishmania in his case, but the liver puncture material injected into a monkey produced infection with leishmania. This infection may just as well have been produced by leishmania, which were too few in number to be detected microscopically, as by the granules which were so numerous.]

The second paper contains an account of similar bodies which were obtained from the liver of a case of Mediterranean kala azar, in a child aged two years from Malta. These bodies are again very similar to those found by ARCHIBALD in his Sudan case. In this case there had been considerable improvement in the general health, and no leishmania were found in the eight smears from liver puncture material, so that the author inclines towards the view that some stage in the development of the leishmania is represented.

Each paper is illustrated by a coloured plate which shows very well the character of the bodies in question.

C. M. W.

CANINE KALA AZAR.

LEMAIRE (G.), SERGENT (E.) & LHÉRITIER (A.). **Recherches sur la Leishmaniose du Chien d'Alger.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 579-581.

The authors have continued the examination of dogs in Algiers for natural leishmania infection. During the four months, August to November, 1912, there were examined 207 dogs. In each case four films from the spleen and bone marrow were searched for parasites, but only two dogs were found infected. Further examinations were made in 1913, during the four months, April to July. During this period, in addition to examination of smears, the bone marrow of each dog was inoculated into NNN medium. Of 279 dogs seven were found infected. In two of these cases the first examination of the smears had given a negative result, whereas the culture on NNN medium was positive. A further search through these films showed two infected cells in the bone marrow of one animal, but in the other no parasites were found. The authors insist, therefore, on the culture method as being more reliable than simple microscopic examination of smears of the organs. They further call attention to the necessity of perfectly fresh NNN medium, when used for culture in this manner. During the examination it was noted that some of the

dogs had lesions of the skin, eyes and mucous membranes, and that these animals became profoundly cachectic, and died after a long illness, while others had no such lesions but were simply emaciated, while their organs contained enormous numbers of leishmania. The authors agree with BASILE that in the dog two types of disease may occur—one a chronic form of long duration, and the other acute and of short duration.

C. M. W.

JAUNOT (A.). **Infection de la Souris avec le Virus de la Leishmaniose canine naturelle.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 683–685.

Two mice were inoculated intraperitoneally from the bone marrow of dogs found to be naturally infected with leishmania in Tunis. One was killed after two weeks, and was found to have a large spleen. Leishmania were found in smears of the liver and peritoneal exudate, but not in smears of the spleen, though culture from this on NNN medium was positive. Three mice and a number of other small animals were inoculated from the liver of this mouse. 24 days later one mouse was killed and parasites found in the peritoneal exudate alone. Culture from the spleen, however, was again positive. None of the other animals became infected. The second of the two mice originally inoculated was also found to be infected when killed on the 28th day. Parasites were numerous in the peritoneal exudate, but were not found in the spleen, which gave again a positive culture. Other animals inoculated from this one did not become infected.

C. M. W.

VISENTINI (Arrigio). **Ricerche Morfolgiche, Culturali, e Biologiche sulla Leishmania della Leishmaniose spontanea del Cane.**—*Rendiconti d. R. Accademia dei Lincei.* 1913. Dec. 7. Vol. 22. Ser. 5. 2 sem. No. 11. pp. 582–587.

La Mie Ricerche di Trasmissione delle Leishmaniosi. [Lettere all'Editore.]—*Pathologica.* 1913. Dec. 1. Vol. 5. No. 122. p. 734.

The author has been working with cultures of leishmania obtained from a naturally infected dog. Structurally, the flagellates do not differ in any way from those seen in cultures obtained from the human virus, and described by the author in an earlier paper (see this *Bulletin*, Vol. 1, p. 360).

The cultures of both the canine and human leishmania in NNN medium will develop and live in Row's medium (*Kala Azar Bulletin*, No. 3, p. 149).

With the culture of the canine virus the author injected intravenously three rabbits, none of which became infected. The same was injected into the jugular veins of two adult dogs. The dogs were killed two and three months later, and leishmania were found in the bone marrow alone of one of these dogs. Two puppies were injected with the canine cultures intraperitoneally. One died on the 104th day, and the other was killed on the 130th day. Both were infected in the spleen and bone marrow. Two other puppies were injected

with culture, intravenously. One died on the 68th day and leishmania were found in the spleen. The other was killed on the 109th day, and no leishmania were found.

The author points out that these results strengthen the belief in the identity of the human and canine leishmania of the Mediterranean districts.

C. M. W.

Tropical Sore.

Brumpt (E.) & Pedroso (A.). **Recherches Epidémiologiques sur la Leishmaniose forestière Americaine dans l'Etat de São-Paulo (Brésil).**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 752–762.

For the disease discussed in this paper the authors propose the name American forest leishmaniasis. It has long been known under various other names, viz., Pian-bois, Forest yaws, Bosch yaws, Bouton de Bahia, Ferida brava, Ulcère d'Avanhandava, Bouba brasiliana, Ulcère de Bauru, Ulcère du Nordoest, Espundia, Ulcère de Torrealba, etc. Clinically, the majority of cases are benign and resemble Oriental sore of the Eastern hemisphere, but about 10 per cent. are malignant, and run on to a much more serious condition. In discussing the etiology of the disease, which is the subject with which the paper chiefly deals, the authors point out that two features are perfectly clear: (i) that the disease is contracted in the forest regions where recent clearing has been undertaken; and (ii) that the ulcers occur on uncovered parts of the body, and are more frequent at certain seasons of the year.

In a case seen by Darling in Panama the patient blamed a Tabanid fly. At Manaos, on the Amazon, A. de Matta accused the tick, *Dermacentor variabilis* (=*D. electus*); in Paraguay Migone likewise regarded ticks as the likely transmitters as also did Flu in Surinam.

The authors, having spent about three weeks in the infested forest regions, met with 65 cases of the disease, and were able to study the various local conditions, and the biting arthropoda which were likely to transmit the malady. Terrestrial leeches (*Haemadipsa*) were not known in the district. As regards Acarines, the authors give a long list of the American Ixodidae which may attack man. In the forest regions the most common of these is *Amblyomma cayennense*. The distribution of the wounds inflicted by the larvae of this tick on the forearms and legs corresponds with that of the ulcers due to leishmania, so that one might be led to suspect this animal, were it not that dogs, which the authors have shown to be liable to the disease as well as man, are not attacked by this particular tick. Further, the fact that the lesions are often multiple indicates that the transmitter is probably some creature which returns to feed persistently when driven away. As regards hemipterous insects, there is no correspondence in their distribution with that of the disease, which is, as already stated, contracted in the virgin forest. Of dipterous insects, the authors mention several which have to be considered. *Lipoptena*(?), Fleas, Tabanidae, *Stomoxys*, Nematocera, Simuliidae, *Ceratopogon*, *Phlebotomus*, Culicidae. Of all these the only insects which in their distribution and habits would fulfil necessary conditions are the Tabanidae. These are met with especially in the forest regions; as a rule they do

not travel far from the locality in which they are hatched, and in their attacks on man they are very persistent, returning to inflict wounds again and again when driven off. This repeated attack seems to the authors very suspicious, and explains how an individual may receive numerous inoculations from one infected fly.

An attempt was made to discover a natural reservoir for the virus in the wild game of the forest, but without success. Of the dogs which accompany the labourers into the forest five were found to have the disease, and in three of these the ulcer was on the nose. The natural disease in dogs appears to have been described previously by A. Pedrosa.

During the present year the authors hope to conduct experiments to test the Tabanid theory of transmission.

C. M. W.

Boletim da Sociedade Brasileira de Dermatologia.—1913. Anno 2. No. 1. pp. 17 & 28. [French resumé pp. 34, 40–41.]

Two cases of leishmaniasis of the mouth and pharynx were exhibited to the Society. The first case was shown by Werneck Machado, and was of a woman aged 60 years. The Wassermann reaction in this case was positive, and no leishmania were found. In spite of this a diagnosis of leishmaniasis was made, and the patient treated with injections of tartar emetic with a complete cure as the result. The second case was shown by G. Vianna to illustrate the good effects of intravenous injections of tartar emetic in this disease, which is very common in the northern parts of Brazil. Ed. Rabello presented a note on the distribution of leishmaniasis in Brazil, and reported cases from Rio de Janeiro and Bahia.

C. M. W.

Padesca (Adelino). **Nota sobre um Caso de Leishmaniase Cutaneo-Mucosa, proveniente do Brasil.**—*Arquivos de Higiene e Patologia Exoticas.* 1913. Oct. 31. Vol. 4. pp. 51–62. With 5 plates.

This paper gives a detailed description of a case of dermal leishmaniasis complicated with lesions of the mucous membranes of the nose and mouth. The patient was 30 years of age, and had come from the Upper Amazon. There were multiple ulcers on the limbs and body, extensive ulceration of the chin, and involvement of the mouth and nose with destruction of the nasal cartilages.

C. M. W.

Minett (E. P.) & Field (F. E.). **Notes on a Case of Dermal Leishmaniasis in British Guinea** [Guiana.]—*Jl. Trop. Med. & Hyg.* 1913. Nov. 15. Vol. 16. No. 22. pp. 249–350.

The case referred to was that of a native of Barbados, aged 47, who had numerous papules and ulcers about the arms, legs and face, with two on the glans penis. Large numbers of leishmania were found in the lesions. The patient had worked chiefly at wood-cutting, and the case appears to be one of forest yaws.

Treatment with mercury, potassium iodide, injections of salvarsan, and neosalvarsan with external applications has so far produced no

improvement. [In the title of this paper Guiana should have been inserted in the place of Guinea (see this *Bulletin*, Vol. 2. p. 453).]

C. M. W.

STRONG (Richard P.), TYZZER (E. E.), BRUES (Charles T.), SELLARDS (A. W.) & GASTIABURU (J. C.). **Verruga Peruviana, Oroya Fever and Uta.**—*Jl. Amer. Med. Assoc.* 1913. Nov. 8. Vol. 61. No. 19. pp. 1713–1716.

Uta is a disease which has existed in Peru since prehistoric times, and has been supposed to be a form of syphilis, leprosy or lupus vulgaris. In Surco and Otao a large proportion of the inhabitants are either afflicted with the disease or show the disfiguring scars, which have resulted from a previous attack, on the face, arms or legs. The authors have discovered leishmania in the lesions; they have obtained the flagellate stage and have successfully inoculated animals from a human case.

C. M. W.

VELEZ. **Uta et Espundia.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. p. 545.

At the meeting of the *Société de Pathologie Exotique*, held October 8th, 1913, the President, M. LAVERAN, announced that he had received a letter from Dr. Velez, dated Trujillo (Peru), July 25th, 1913, informing him that he had discovered leishmania in the disease known as Uta. The writer of the letter with somewhat undue haste wishes to create for the parasite the name *Leishmania peruviana*, owing to certain differences which he imagines to exist between it and other forms of leishmania. LAVERAN justly remarks that this is a difficult question which will require investigation, but that in all probability the disease Uta will be found identical with the Espundia of other parts of South America.

C. M. W.

WAGON (P.). **Un Cas de Leishmaniose cutanée traité avec Succès par l'Arsénobenzol (Billon).**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 624–625.

The case described is that of a Frenchman who came to Niamey (on the Niger), in November 1912. During his stay there up to May 1913, he suffered from numerous attacks of fever and came for treatment for malaria to Cotonou in June 1913. It was noted he had various skin lesions about the legs and arms. These had recently appeared. The largest was an ulcer 2–3 centimeters in diameter. Most of them were crusted over and purulent. Examination of smears from these lesions showed typical leishmania.

By way of treatment an intravenous injection of 0·30 gram of salvarsan was given. There was considerable reaction, with elevation of temperature (38° C.) and vomiting. After treatment the lesions commenced to heal, and within a fortnight the patient was discharged perfectly cured.

The author remarks that dermal leishmaniasis had previously been described by STÉVENEL from Nguigmi, near Lake Chad, and by BENOIT-GONIN in the Agadès-Taoua district.

C. M. W.

NAPIER (A. H.). **A Note on Frontier Sores.** [Correspondence.]—*Indian Med. Gaz.* 1913. Oct. Vol. 48. No. 10. p. 413.

Writing of what is called Frontier Sore in the Derajat district, the author states that an examination of fifteen cases revealed leishmania in only one, so that it is a mistake to regard Frontier Sore and Oriental Sore as identical. The cause, the author claims, is a micrococcus, together with a stoutish bacillus.

C. M. W.

MALARIA.

Babington (W. H.). **Appendicitis simulated by Malaria.**—*Jl. R. Army Med. Corps.* 1914. Jan. Vol. 22. No. 1. pp. 82–83.

A record of two cases, one occurring in Malta, and the other at Scutari, in which the abdominal symptoms simulated appendicitis. In the first case the abdomen had been opened, but the appendix was found to be quite healthy; benign tertian parasites were found in the peripheral blood; the patient was completely cured by quinine.

In the second case, the tenderness over McBurney's point and the pain elicited by rectal examination suggested a localized inflammation of the appendix. Malaria parasites were numerous in the blood. All symptoms disappeared after an intramuscular injection of quinine.

P. H. Bahr.*

de Almeida (Theophilo) [Junior.] **Um Caso de Asthma palustre, observado numa Menina de Sete Annos.** [A Case of Malarial Asthma in a Girl of Seven.]—*Archivos Brasileiros de Med.* 1913. Sept. Vol. 3. No. 8. pp. 776–778.

The case of a girl in the Rio de Janeiro hospital, who presented symptoms of acute asthma. Emetics, belladonna plasters, blisters, fumigations, and doses of potassium iodide internally, failed to relieve the condition. Fever was marked, and malaria parasites were found in the blood. Euquinine, 80 centigrammes per diem, materially relieved the symptoms and apparently cured the patient.

Similar cases, and also relieved by quinine, have been reported by Matta, of Manaos.

P. H. B.

Dumolard, Aubry & Granger (M.). **De l'Aortite Paludéenne.**—*Rev. Méd. d'Alger.* 1913. Dec. pp. 1–25. With 2 plates.

The effect of chronic malaria infection on the vascular system was first suspected by Baumes in 1821, and subsequently by Maillot, Boudin, and Kalther. Quite recently, Pivassy has brought forward statistics in support of this view. The authors of the present paper made their observations at the hospital at Mustapha, a malarious spot, where cases of chronic aortitis and aortic dilatations were frequent. They believe these aortic degenerations are the result of chronic paludism. Malaria parasites [species not stated] were found only in a few instances.

[Before the author's conclusions can be accepted, a more extended study is certainly required.]

P. H. B.

Noland (Lloyd) & Watson (F. C.). **Spontaneous Rupture of the Malarial Spleen. A Report of Three Cases.**—*Proc. Canal Zone. Med. Assoc. for the Half-year, April to Sept.* 1912. Vol. 5. Pt. 1. pp. 108–114.

Traumatic rupture of enlarged malarial spleens is of common occurrence, but the authors consider a record of spontaneous rupture of the organ in three patients, in whom injury could be definitely excluded,

* Dr. P. H. Bahr is in charge of the Malaria and Blackwater Fever Sections during Dr. Balfour's absence abroad.

to be of great rarity and interest. Two were West Indian negroes, and one a Spaniard, labourers in the Canal Zone. All cases were operated on; one died, and two made a good recovery. The subtertian parasite was found in all, in the fatal case in smears of the spleen pulp post mortem. No note is made of the developmental stage of the parasite.

In two cases the symptoms resembled those of peritonitis, and a rupture of some viscus was suspected; in the third a tentative diagnosis of splenic abscess was made. In the fatal case, the onset of abdominal pain and consequently of the haemorrhage was sudden, and was not accompanied by a typical malarial attack, whereas the others had suffered from typical ague fits a few days previously. A moderate leucocytosis was present.

At each operation a moderate amount of free blood was found in the peritoneal cavity, estimated in the fatal case at 1,000 c.c. The rent in the splenic capsule, the scene of the haemorrhage, was found twice, but once omental adhesions prevented the attempt. Tamponage rather than suture was resorted to to control the haemorrhage; no attempt at removal of the spleen was made. In the fatal case, complete suppression of the urine supervened before death. At the autopsy, no fresh haemorrhage was found to have occurred, but there was a rent in the splenic capsule three inches long. The kidneys were granular.

As to the pathology, the authors consider that rupture of the splenic capsule is secondary to rupture of the engorged capillaries with haematoma formation and consequently increased tension. The condition is compared to spontaneous rupture of the spleen in typhoid fever (thirty-seven cases of this condition have been reported). The diagnosis in life presents certain obvious difficulties. The authors lay stress on BALLANCE's sign—*i.e.*, fixed dullness in the left flank, together with severe abdominal pain, symptoms of collapse, a history of previous malaria and the discovery of the malaria parasite in the blood. The conclusions are as follows:

(1) "Spontaneous rupture of the spleen in malaria occurs in rare instances.

(2) "The spleen does not necessarily have to undergo a great degree of enlargement for spontaneous rupture to occur.

(3) "Very deep palpation or forcible percussion of the enlarged malarial spleen should be avoided.

(4) "Exploratory puncture of the spleen for diagnostic reasons is not without danger.

(5) "The treatment of spontaneous rupture of the malarial spleen is surgical. . . . . ."

P. H. B.

GASBARRINI (Antonio). **Das Bordet-Gengousche Phänomen (Komplementablenkung) bei Malaria.** [The Bordet-Gengou Phenomenon (Complement Deviation) in Malaria.]—*Zeitschr. f. Immunitätsforsch. u. experiment. Therapie.* 1 Teil. Orig., 1913. Nov. 24. Vol. 20. No. 1–2. pp. 178–197.

The author reviews the works of CASAGRANDI, FRONGIA and other observers on the occurrence of the Bordet-Gengou reaction in malaria, and then enters into particulars regarding his own technique. The paper is almost entirely a laboratory one, and it will suffice if the author's conclusions are stated, together with a few notes on the clinical application of the test. He finds that:—

1. The blood serum of malaria patients during the rigor, when the temperature is falling, and for a very few days after the last recurrence of fever, does not cause any complement deviation. On the other hand, it does deviate complement, after having undergone treatment, *i.e.*, after having been freed of haemolytic amboceptors by some absorption method like that of Jacobäus and Mintz, or the procedure of Rossi.

2. The untreated serum of chronic malaria cases which had been free from relapses for a varying length of time, gave a more or less marked Bordet-Gengou reaction. Previous treatment of the serum almost always intensified the reaction.

3. Control sera from patients suffering from diseases other than malaria, and sera from healthy people have never, even when treated as above mentioned, yielded the reaction.

4. The serum of actively relapsing malaria cases has a greater haemolytic power than that of latent cases of the disease.

Gasbarrini notes that in one case his results did not altogether bear out the frequently advanced hypothesis that a positive Bordet reaction with malaria serum indicates a cure. He also deals with the value of the reaction as a diagnostic test in doubtful cases. In one instance, when it was positive, spleen puncture, at a later date, revealed the presence of macrogametes.

He concludes that it can be successfully used for the diagnosis both of latent malaria, and of actively relapsing malaria. In the latter the test is invariably positive, provided the serum has previously been treated by Rossi's method for the removal of haemolytic amboceptor. It is, however, admitted that further research on the subject is required, especially in the direction of improving the method of preparing the antigen.

It has yet to be decided whether complement deviation occurs in cases of primary malaria and the influence of various stages of the infection, and of quinine, on the test have to be worked out. There seems to be little doubt that malaria confers an immunity which determines its varying ameliorations and aggravations seen in times of epidemic prevalence.

A. Balfour.

MacGilchrist (A. C.). **The probable Ratio of Relapses and Fresh Infections to the Total Attacks of Malarial Fever, and a Discussion of Quinine Dosage.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 339-346.

Two important tables are embodied in this paper. The first gives the actual numbers admitted to the Jessore Jail hospital for malarial fever month by month, for eight years prior, and eight years subsequent to the introduction of quinine prophylaxis. The second table prepared from the first gives a consolidated view of the situation, the figures being reduced to a common denominator and thus affording a readier comparison.

The non-malarious season in Jessore extends from January to June. During that period new comers to the district seldom get an attack of malaria, and mosquitoes are comparatively rare. Both before and after the introduction of quinine prophylaxis, the average monthly

number of admissions for malaria per 1,000 prisoners is remarkably similar, about 25; the author considers this number to represent cases of relapse.

The average number of admissions per month per 1,000 prisoners during the fever season—July to December—before the introduction of quinine prophylaxis is above 40; this number, the author considers, represents 25 relapses and about 15 fresh infections; he thinks, therefore, that 3/13 of the annual total number of fever cases represents fresh infections. Could relapses be prevented by a system of quinine prophylaxis, the author thinks that the number of fresh infections would soon be enormously reduced.

The methods of giving quinine in prophylactic doses are given and criticized. The most effective method must be one which will allow the maximum concentration of quinine in the blood for the longest period. Patients who have never taken quinine should never receive an initial large dose, owing to a possibility of an idiosyncracy to the drug. Quinine poisoning is apt to occur if the drug is contaminated with other alkaloids of the cinchona bark, such as cinchonine and cinchonidine.

In order to get satisfactory results in the treatment of malaria, it is necessary to give larger and larger doses of quinine, and to repeat them more frequently. MacGilchrist therefore recommends 20 grain doses, with or soon after food, at intervals of eight hours, this treatment to be continued for the first three days. For after-treatment or disinfection, he gives 20 grains each night for a week or longer.

As a prophylactic in Jessore Jail 15 grains of quinine are given on two consecutive days each week, after meals, as if given before the prisoners tickled their throats till they vomited. This treatment does not disinfect the individual, but only keeps the malarial parasites in subjection.

P. H. B.

MacGilchrist (A. C.). **A Plea for a More Extended Use of Quinine Alkaloid.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 347-351.

Very little quinine is absorbed from the stomach, most is absorbed from the small intestine. When the quinine salt reaches the duodenum it is precipitated in an amorphous form. The author believes that the amorphous precipitated quinine is the best all-round form to administer, both for treatment and prophylaxis of malaria.

The advantages of amorphous precipitated quinine base or alkaloid, are: (1) It is sparingly soluble in water and almost tasteless; (2) Absorption is as quick and complete as after the administration of quinine salts; (3) Being pure quinine, it represents quinine in the smallest bulk and weight; (4) Being non-haemolytic, it may possibly be used with great safety in diseases accompanied by haemolysis; (5) Low cost.

Quinine sulphate appears to be cheaper than quinine base, but is too soluble, 1:800, and therefore too disagreeable to take as a powder. Tablets of quinine sulphate are never so sure in action as in powder form: therefore any slight economic advantage of the sulphate becomes insignificant when compared with the quinine base. The use

of euquinine and quinine tartrate depends on their slight taste, due to their insolubility.

Quinine base can be administered intravenously without any danger of thrombosis or shock from irritation; it is three times as soluble in the blood stream as in water. By previous solution in alcohol and using normal saline as a diluent a solution of 1:2,000 can be obtained by means of which 15 grains of quinine alkaloid can be introduced in three pints of solution.

Quinine base in doses of ·004-·03 grammes per kilo weight was injected into rabbits intravenously dissolved in 33 per cent. alcohol (in a dilution of 1:135), without any ill-effects being observed.

The author concludes that the precipitated quinine base is the best all-round form in which to administer quinine by the mouth or intravenously, and it is to be preferred in cases where haemoglobinuria is dreaded.

P. H. B.

SUMMA. **Zwei Malaria-tertiana-Rückfälle unmittelbar nach energischer Salvarsanbehandlung.** [Two Cases of Relapse in Tertian Malaria immediately after energetic Treatment with Salvarsan].—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 836-837.

At Windhuk, in German South West Africa, the action of salvarsan on tertian malaria is being tested. In two acute primary cases the results were very satisfactory, the drug, given intravenously in a dose of 0·6 gramme, causing a rapid disappearance of parasites from the blood. In certain cases relapses were noticed, and these at first were attributed to insufficient dosage, salvarsan being regarded as fully the equal of quinine. Two recent cases, however, have demonstrated the superiority of the latter drug. These cases, which are described in some detail, were treated energetically with salvarsan. In neither was there any possibility of reinfection. Both, during the relapses, showed sexual forms of the malaria parasites in the blood. The relapses occurred three weeks after the last salvarsan injection. The author, as a result of his observations, suggests a combined therapy with salvarsan and quinine. He intends trying it.

A. B.

LAMBALLE (F. W.). **The Utility of Enzymes in Malaria.**—*Jl. R. Army Med. Corps.* 1913. Dec. Vol. 21. No. 6. pp. 660-669; and *Med. Record.* 1913. Nov. 27. Vol. 84. No. 21. pp. 928-931.

The author is no believer in the efficacy of quinine in malaria. This doubt he has held for the last ten years since he had a large experience in Hong Kong, where the admission rate to hospital for malaria was 2,400 per thousand troops; that is, every man in garrison was a patient in the hospital nearly two and a half times every year; nearly all the admissions being cases of relapse.

To prevent relapses in the Indian troops, the quinine treatment is being systematized as follows:—(1) No case is diagnosed as malaria until the parasite has been discovered in the blood; (2) No case of

malaria leaves hospital until the peripheral blood shows no plasmodium; (3) After leaving hospital, all malaria patients are placed on a "malaria register" and attend for further treatment. Benign cases receive quinine sulphate in acid solution 10 grs. daily for one week, and afterwards thrice weekly, until four months of quinine treatment have been completed. Malignant cases receive quinine in the same form, 10 grs. daily for one month, and afterwards thrice weekly for three months longer.

In spite of these measures, relapses occur. As regards the etiology of these relapses, Lamballe quotes BEARD's work (1907) on the part played by ferments in the protection of the animal body. From this it is inferred that schizogony of the malaria parasite produces the clinical disturbance called fever; asexual growth of the parasite can proceed to an unlimited number of generations or cell divisions, until checked by the natural protective ferments of the animal body. In the same manner as the trophoblast is checked in its growth by the ferments of the developing embryo, so the natural protective ferments of the host react against the asexual phase of the parasite and sexual forms begin to appear; these are harmless.

The varying degree of immunity, the degree to which the malaria remains dormant, is a measure of these natural protective ferments. As these ferments are insufficient to destroy the asexual forms, the disease recurs. There is no essential pathological difference between the cases termed "relapse" and those called "recrudescence."

From BEARD's work it follows that the natural means of destroying the organisms of such tropical diseases as malaria, trypanosomiasis, yellow fever, relapsing fever, and kala azar are the use of the powerful pancreatic ferments, trypsin and amylopsin.

In January, 1913, an opportunity presented itself to the author of testing these theories. Cases of severe infection and those showing relapses were selected. Fairchild Bros. and Foster's injections were used in ampoules of 1 cc. The *injectio trypsini* had a digestive value of 1,850 Roberts units, the *injectio amylopsini* contained 500 Roberts amylolytic units. These injections are sterile and stable in the tropics, and are given hypodermically or intramuscularly. Lamballe gives one ampoule of amylopsin and one of trypsin at the same time; a local oedema develops at the site of the injection. As a rule, a single dose is sufficient to clear the peripheral blood of parasites. In severe cases the injections are continued until the injections themselves cause a rise in the patient's temperature. When this so-called "trypsin reaction" takes place, the patient is fully under the influence of the treatment. Usually this occurs with the third injection, after which the worst cases have remained free from relapse.

Details of twelve clinical cases are given, all occurring in British soldiers, in whom previous quinine treatment had failed to prevent relapses; some even were suffering from cinchonism. The rapidity with which the parasites disappeared from the circulation is remarkable; even the malignant crescents disappeared after the first injection.

[The author does not say whether intramuscular injections of quinine were first tried in these twelve cases; it is possible that these would have proved equally effective. It would be interesting to observe whether these ferments have any effect on cultures of the malaria parasite *in vitro*.] P. H. B.

ORENSTEIN (A. J.) **Screening as an Antimalaria Measure. A Contribution to the Study of the Value of Screened Dwellings in Malarial Regions.**—*Proc. Canal Zone Med. Assoc. for Half-year, April to Sept.* 1912. Vol. 5. Part 1. pp. 12-17. With a sketch map.

An unusual opportunity of studying the relative value of screening against mosquitoes, in a country where malaria is endemic and rather prevalent, exists in the settlement of Gatun in the Canal Zone.

In the principal settlement of Gatun, founded in 1906, primarily for the accommodation of employees engaged in the construction of the canal, all the buildings were thoroughly screened with the approved eighteen-mesh copper gauze. A village known as New Gatun sprang up in proximity to the European settlement. In New Gatun the houses are not screened.

An attached map shows the relative geographical position of Gatun and New Gatun; the Anopheles breeding areas are at an equal distance from each. The population of Gatun consists of 500 Americans in bachelor quarters, 1,500 white Europeans in barracks, 200 Americans in married quarters, 1,000 West Indian natives in barracks, and 1,300 others living in miscellaneous quarters. All quarters are screened. The population of New Gatun, engaged in approximately the same work, consists of 2,500 West Indian natives and European labourers, all of whom live in unscreened houses, and about 2,500 others. As far as malarial incidence is concerned, the two settlements differ in only one respect, namely, the screening of the sleeping quarters.

A brief explanation of the method used in computing percentages of malaria is given. At the end of each week the District Physician reports to the Chief Sanitary Officer the number of cases of malaria seen by him that week; the number of cases of malaria for each district are then computed as percentages of the total number of employees residing in the district. In arriving at the "Average Monthly Percentages" of employees for Gatun and New Gatun, the weekly percentages for each year were added and the sum divided by twelve, thus arriving at an average per month for each year. These important figures are represented in the tables, one of which is here given :—

Table II.—Malaria incidence in Gatun and New Gatun during the months of May to September, both inclusive, of each year (when Anophelines are most numerous).

Year.	Gatun.	New Gatun.
1909	5·35% ..	.. 10·04%
1910	5·37% ..	.. 9·21%
1911	8·75% ..	.. 12·59%

During these months of greatest Anopheline prevalence, the relation of malaria incidence for Gatun and New Gatun is as 2 to 3.

The deaths from malaria among employees residing in the towns of Gatun and New Gatun is shown in Table III :—

Year.	Gatun.	New Gatun.
1909	5; =1 per 1,000 ..	4; =2·7 per 1,000.
1910	9; =1·7 „ „ ..	4; =1·6 „ „
1911	2; = ·4 „ „ ..	3; =1·2 „ „

These figures do not show two factors of great importance :—

(1). The employees residing in screened barracks are not allowed to

remain in the barracks unless they bear a physician's certificate; this results in every case of malaria being seen by him. The employees in unscreened barracks are not so controlled, and consequently many cases of malaria amongst them are missed.

(2). The proximity of the unscreened settlement with its large number of malaria carriers furnishes a number of infected Anopheles, these affecting to some extent the employees residing in the screened quarters who quite frequently spend their evenings in New Gatun.

The paper concludes with a few maxims regarding screening, which are given in full.

1. Screening to be effective must be thorough.
2. A screened dwelling with defects in the screening, (ill-fitting doors etc.) is probably worse than an unscreened dwelling, for in such a house, mosquitoes though readily finding an entrance, once having entered, will not leave.
3. The wire gauze screening must have a sufficient number of strands per square inch to ensure the impossibility of mosquitoes entering. Eighteen mesh gauze is used in the Canal Zone, and is effective.
4. The screening must be tight, this will prolong its life.
5. All doors should open outward, and should be provided with an efficient closing device, and should be hung so that they will not warp or sag.
6. Windows should not be fitted with removable or sliding screens. Practice has shown that the average person will not use care in keeping adjustable screening carefully closed and mosquito proof.

In the Canal Zone screening does not make the rooms much hotter. The temperature seldom rises above 94° F; the average daily temperature is approximately 80° F. The highest grades of copper only are used, and the screening is kept free from dirt and products of corrosion by frequent brushings.

The conclusions are as follows :—

"1. A properly screened dwelling can be depended upon to reduce by at least one third the malaria incidence in a locality where malaria is endemic.

"2. In order to be effective, screening must be carefully planned, well installed, and kept in good repair."

In the discussion which followed the reading of this paper, Colonel Gorgas expressed his personal opinion of the value of screening; he considers that it will never be dispensed with, as one can never be sure of the disappearance of mosquitoes.

[If anything could increase one's admiration for the sanitary work of the Americans in Panama, it is the conciseness and brevity of their papers, of which this is an excellent model.]

P. H. B.

Gunasekara (S. T.). **Report on the Anti-malarial Campaign at Kurunegala.**—13 pp. folio. With 4 plates, 4 maps, and 1 chart. 1913. Colombo: Printed by H. C. Cottle, Govt. Printer.

A very full and instructive account of the campaign against malaria in the town of Kurunegala, Ceylon, referred to in this *Bulletin* (Vol. 2, p. 535).

This campaign, begun in September 1911, was the first systematic attempt in Ceylon to deal with the disease by antimosquito measures; this report deals with the measures adopted.

An account of the town, the population, and climatic conditions is given. A chart shows the seasonal incidence of malaria over a period

of eight years, from which some conclusions as to the epidemiology of the malaria in the district are derived.

(1) Every 12 months there are two rises in the curves of rainfall, temperature, and malaria incidence.

(2) The fastigium of rainfall and temperature generally coincides.

(3) The malaria incidence commences to rise after the climatic fastigium, and reaches its maximum three or four months after.

(4) In the years 1906, 1908 and 1911, malaria assumed epidemic proportions (over 2,300 cases in a population of 8,000 in 1911).

(5) In each of these years preceding the epidemic, there was a period of very low rainfall, succeeded a month before the onset by a sudden rise in the rainfall of short duration, and insufficient to cause flooding.

Some interesting figures of the number of Government servants temporarily incapacitated on account of malaria are given; in 1910, out of a staff of 189, this was no less than 68, a percentage of 37·9. It is hoped that these statistics will appeal to the Government and instigate it to adopt further preventive measures. An account is given of the methods so far adopted, which were recommended by a Committee appointed by the Government. These were based on the usual lines, and appear to have been excellently carried out; they included public lectures and educational courses in the various schools. General sanitation has not been neglected. Gunasekara regards the paddy fields situated in the centre of the town as the main factor in the situation; he gives a table showing the condition of these fields during different months of the year, from which it is apparent that they contain anopheline larvae all the year round, in spite of the presence of the four species of larvivorous fish, of which drawings are given to scale. The highest spleen rates are found in collections of houses in close proximity to the paddy fields.

The most instructive part of the paper from the point of view of tropical sanitation, deals with the effect of certain larvicidal preparations in the field. Xex-green, a heavy oily liquid said to be innocuous to cattle, was tried. It was less effective than petroleum, and more expensive.

Potassium cyanide, as recommended by Ross, was found in the laboratory to kill culex and anopheline larvae in a dilution of 1 : 75,000; higher dilutions had no effect on anopheline larvae. In the field results were very variable, and a dilution 1 : 37,000, or eight times the strength recommended by Ross was required.

A commercial preparation of potassium cyanide, containing 40 per cent. of the pure salt, was tried but on account of its poisonous nature had to be abandoned.

Sanitas-okol, as sold by the "Sanitas" company, was found to be an effective larvicide in a dilution of 1 in 1,280 (two teaspoonsful to the gallon). Sanitas-okol is easily miscible with water. Phenyle was found to be just as effective and has the advantage of being cheaper; it is practically non-poisonous to cattle.

Izo-izal is said to be non-poisonous, and to be easily mixed with water. Experiments in the laboratory and in the field showed this preparation to be far more toxic to larvae than Phenyle. "Larvicide" is another preparation sold by the proprietors of Izo-izal, but Gunasekara found it less toxic to larvae; he suggests that Izo-izal is the ideal larvicide if only it could be procured at a sufficiently cheap

rate in Ceylon. "Pesterine," a mixture of equal parts of crude petroleum and kerosine, was found to produce an even film when spread on the water, but in the presence of much floating refuse and aquatic vegetation in the rice fields it was worse than useless; open pools in Kurunegala had to be oiled every four days to be at all effective.

The use of larvicides in the rice fields was found to be, from obvious considerations, quite an impracticable measure.

The author concludes as a result of his campaign :—

(1) Minor measures are of little avail, as the paddy fields are the chief breeding places of the anopheles in Kurunegala.

(2) Measures, such as mosquito-nets, screened rooms and quinine distribution, can never become universal, as only a small proportion of the town people can afford them.

(3) The only method of preventing the breeding of anopheles in paddy fields is to prohibit their cultivation.

The recommendations for future work coincide in the main with those given in the reviewer's report already referred to, which was drawn up after consultation with Gunasekara. A number of appendices and some quite instructive photographs close the report. Special attention should be paid to the first photograph, which illustrates the condition in which drains should not be kept.

[The author is to be congratulated on the sensible view he has taken of the situation. He does not wish to abolish all paddy fields, which afford a source of food and employment to so many natives, but only those which are by reason of their situation dangerous. The Ceylon Government can also be congratulated on the amount of work done over a period of 22 months, for the comparatively low cost of £998.

A few criticisms might be offered. The spleen rates given by Gunasekara are much higher than in the reviewer's report on the same subject, which were obtained by palpation. Gunasekara appears to have employed the percussion method alone, although he does not state so in his report. A comparison of spleen rates obtained at various periods is of little value in showing the reduction of malaria, unless every care is taken to ensure employment of a uniform and reliable method. It is to be regretted, too, that the total number of blood examinations, or the proportion of the various parasites found at various seasons, are not stated. A large number of apparently wild mosquitoes were dissected, and individual specimens of *Myzorhynchus sinensis* and *Myzomyia culicifacies* are said to have been found infected. We are not informed either of the number of insects dissected, the proportion found infected, or the stage of the parasites they contained.

In view of the difficulty experienced by the author in identifying the various anopheles in Kurunegala, it would be advisable to repeat the dissections of *M. sinensis*, which has only rarely been found naturally infected elsewhere.]

P. H. B.

WATSON (Malcolm). **Mosquito Reduction and the Consequent Eradication of Malaria.**—*Trans. Soc. Trop. Med. & Hyg.* 1913. Dec. Vol. 7. No. 2. pp. 59-70.

An account of Dr. Watson's well-known work on malaria prevention in rural areas in the Federated Malay States, most of which has already been published.

The work began in 1904 when the Government contributed 110,000 dollars for the drainage of 24,000 acres. Since then, with the drainage and cultivation of the land, malaria has disappeared over some 500 square miles.

A definite connection was traced between the malaria and its carrier, *A. umbrosus*, a breeder in stagnant jungle pools. The spleen rate was found to diminish the further the population was removed from the jungle pools, and malaria had completely disappeared half a mile away from such a pool. The death rate was found to correspond with the spleen rate. The knowledge derived from Dr. Watson's experience permitted two important rules to be drawn up for the guidance of the planters. These were—

(1) Removal of habitations to a distance of half a mile from the jungle pools, or

(2) Felling of jungle and drainage of jungle pools for a similar distance.

As a result of these measures, the spleen rate on many estates is now ·5 per cent., and the death rate from 5–20 per 1,000.

An account is next given of the anti-malarial measures in the hill land, where malaria was rife. Public works, as well as private enterprise, were time and again brought to a standstill. The malaria carrying anopheles was found to be *A. maculatus* (termed by Dr. Watson at that time *N. willmori*), which bred in the clear and rapidly flowing mountain streams. These streams were consequently put underground, and immediate improvement resulted. The daily sick dropped on North Hammock Estate from 13·5 per cent. in 1911, to 2·2 per cent. in 1912, the spleen rate from 91 per cent. to 14 per cent.

Dr. Watson has also studied the wet cultivation in the Malay States. He found 66,000 acres in Krian practically free from the disease, only 2·7 per cent. of the children having enlarged spleens; four species of Anopheles were present, *rossii*, *mochii*, *sinensis* and *barbirostris*, none of which, with the doubtful exception of *sinensis*, is known to be an efficient malaria carrier, but in an open valley near by he found much malaria, and an additional three species of anopheles, *umbrosus*, *nivipes* and *albirostris* were present, and in the hills on both sides of the valley *A. maculatus*. The author concludes that the rice fields are not in this instance a factor in the situation.

Watson is struck with the similarity in the distribution of the malaria in the Malay States and in India. *A. maculatus* is also the chief carrier of hill malaria in India, though erroneously termed *A. metaboles* in the reports of Stephens and Christophers; therefore a parallel can be drawn between malaria in the Malay States and that of the Duars and Jeypore Hills, regions of intense endemicity.

To determine whether his views on the eradication of rural malaria could be applied to other countries, Watson visited Sumatra, Panama and British Guiana.

In Sumatra, though only 35 miles distant at the nearest point from the Malay Peninsula, the death rate of the labour force is very low. A fairly high spleen rate was found on the mangrove coast line and inland near to a swamp, but no trace of malaria, and no stream-breeding anopheles in the hill-land. *A. maculatus* has never been taken there.

The sanitary system in the Panama Canal Zone was studied during

a stay of three weeks. As is well-known, drainage is mainly relied upon, oiling being only a subsidiary measure when drainage is impracticable. Draining is done for 200 yards round each building, but screening, though formerly of great value, is considered of less importance nowadays. The chief anopheline carriers in Panama are *Cellia albimanus* and *Cellia argyrotarsis*. Both breed in running water.

British Guiana is of interest because in it are found the same anopheles as in Panama. Most of the cultivated land is below high tide level and has to be protected by sea defences. The high spleen rate of the British Guiana plantations is associated with a low death rate. This apparent anomaly Dr. Watson found to be due to the inclusion of all spleens said to be enlarged by "percussion." The healthiest estates are Port Mourant and Albion on the Corantyne Coast. Here the hospital death rate is only 5·6, and the spleen rate 2 per cent; here were numerous drains and canals receiving only the attention necessary for estate work, and no oiling of the edges; the population were settled on the edges of 3,000 acres of rice swamp, but no anopheles were found in these drains or swamps. Evidently for some reason or other this area is not suitable as a breeding ground of anopheles.

In Barbados Dr. Watson confined his attention to ascertaining whether the absence of malaria is due to the presence of "millions" or the absence of breeding places suitable for anophelines. In his opinion the absence of suitable breeding places is the real explanation.

[In the discussion, G. C. Low gave reasons for doubting this.]

P. H. B.

Manteufel. **12 Jahre Malariabekämpfung nach dem von Robert Koch angegebenen Verfahren.** [Twelve years' experience of Anti-Malarial Measures as suggested by Robert Koch.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1913. Dec. 12. Vol. 76. No. 2. pp. 350-360.

From 1901 to the end of 1903, an expedition under Ollwig was at work in Daressalam in German East Africa. As a result of the campaign in that town similar measures were undertaken elsewhere, as for instance in Tanga. The paper is a retrospect of the effect of these measures. Red Cross sisters are responsible for the practical application of the scheme, and to them are attached several Goanese skilled in microscopy. In Daressalam there are two, but in Tanga only one such sister. Blood films are examined by Ross's thick film method and stained by Giemsa.

All infected persons are dosed with quinine (15 grains every six days for adults); the natives try to avoid this method by every possible means. Mosquito nets and screening of European houses has only lately become universal, and anti-mosquito measures have been only recently undertaken.

It is not possible for many reasons to give accurate statistics of the amount of malaria amongst Europeans in Daressalam; nevertheless, the author gives certain figures which, unfortunately, indicate that neither the case incidence nor mortality from malaria and blackwater fever has fallen during the last twelve years. On the other hand, a slight reduction in the blood infections is indicated by the result of a yearly blood examination made on all Europeans since 1907.

Amongst the natives, both adults and children, the malaria parasite rate has risen to an alarming degree (in Tanga from 35 to 81·5 per cent.). Their dislike to quinine prophylaxis increases from year to year; according to the author the native suffers much more inconvenience from the effects of the quinine than from the malaria. Amongst the Europeans it is also becoming more unpopular every year.

Therefore, in face of active and passive resistance, KOCH's methods are yearly becoming more and more difficult to carry out. The effect of general education measures is seen in the diminution of numbers of fresh infections amongst the European population, but they are still as prevalent as ever among the Goanese, Indians, Arabs and natives, who are unable to carry out any personal hygienic measures. The Goanese and Indians are very liable to blackwater fever. The mortality from malaria amongst the native children is very large; even the adults do not acquire complete immunity, as the author has seen them die of cerebral malaria. The author suggests that the large sum of money (£1,000 per annum) now expended on quinine would be better utilized on general sanitary measures. In 1912 he proposed to the Government to restrict the quinine distribution to the Europeans and to the natives living in European quarters. In 1911 and 1912, LURZ and the author initiated anti-mosquito measures by spraying out the native huts with GIEMSA's "Mosquito Fluid" in order to kill off all infected anopheles. No figures are yet available to show the effect of these measures.

The author hopes that the Government Anti-Mosquito Regulations of January 1st, 1913, will be properly carried out, especially with regard to screening of European houses and the segregation of the natives and European quarters.

The conclusion is inevitable that, though KOCH's quinine prophylaxis has been successful elsewhere, it has for various reasons failed in Daressalam.

[No estimation of the spleen rates appears to have been made in demonstrating the incidence of malaria. Blood examination alone has been relied upon. It is obvious that in drawing up such a comparative statement as is made in the author's tables there are many sources of fallacy, such as the methods employed in making and staining the films, the stage of the disease, and lastly the personal equation.]

P. H. B.

von CELEBRINI (Emil). **Malariabekämpfung im österreichischen Küstenlande.** [The Control of Malaria in the Austrian Littoral.] —*Das österreich. Sanitätswesen.* 1913. Nov. 27. Vol. 25. No. 48. pp. 1593-1599.

The author, who is a disciple of CELLI, is resident in Trieste, and has had very considerable experience in the organisation and prosecution of the anti-malarial campaign which has been in operation upon the Austrian littoral since 1903. Every known and approved method of attacking the disease and its carrier has been employed. At an early date it was found that if quinine prophylaxis was to be really effective the drug must be given in daily doses. When thus administered all unpleasant symptoms cease after the third day of treatment. For children, who form the main reservoir of the parasites, chocolate

pastilles containing the tannate are found indispensable, and the importance of *thoroughly* treating children under ten years of age cannot be too strongly insisted upon.

Information is furnished as to the factors determining the incidence of malaria in certain localities. Amongst these the poverty and malnutrition of the inhabitants play a notable part. It has been observed that the badly nourished are unable to tolerate quinine in large doses, while in the case of those sufficiently fed its action is so beneficial that it is a popular remedy amongst the people generally. The author lays stress on the necessity of blood examination, both as a means of diagnosis and as a guide to treatment. A spleen survey alone is quite unreliable. Splenomegaly is often present in children without malaria. It is seen in cases of rickets. On the other hand it is frequently almost imperceptible in children showing malaria parasites in their blood. [See this *Bulletin*, Vol. 2, p. 537.] There are some remarks on petrolage fumigation for mosquitoes, the use of GIEMSA's spray and of larvivorous fish. As regards the last-named, it is interesting to note that in one pool a fresh-water crab was found to be a dangerous foe to the fish [species not stated.] It is evident from the particulars given that before any systematic anti-mosquito campaign is undertaken the biology of the anophelines of the various districts requires thorough investigation. There are other matters of interest considered in this paper, but it is sufficient to quote the author's conclusions, which are briefly as follows :—

1. The only rational way of controlling malaria in the Austrian littoral is by a systematic curative and prophylactic quininisation of the inhabitants.
2. In order to keep the peripheral blood free of parasites in the malarial seasons, the quinine must be given daily. A daily prophylactic dose of 0·4 grammes for an adult is, as a rule, satisfactory.
3. For treating children, the use of tablets of quinine rendered agreeable to the taste is essential. Without a general treatment of children, malaria cannot be controlled.
4. The destruction of anophelines is generally difficult to accomplish, and must be preceded by a careful biological survey of the region under consideration.
5. Mechanical prophylaxis is costly and of little value. Moreover it is difficult to carry into effect.

A. B.

KÜLZ (L.). **Selbstversuch mit einer neuen Prophylaxis auf Grund der Malariaprodrome.** [Personal Trial of a Prophylaxis based on the Occurrence of a Malarial Prodrome.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 834-835.

In Kamerun the author has noticed certain definite prodromata in tropical malaria. He does not know if they also occur in benign tertian and quartan infections, as he has had little experience of these forms. In malignant tertian infections prodromal symptoms vary in intensity and completeness, but if sufficient care be taken to recognize them they are found never to be wholly absent. They occur two or three days before the actual onset of the paroxysm, and affect chiefly the nervous system. The patient becomes low-spirited and irritable. He has a slight headache, a feeling of fatigue and some rheumatic pains. A greatly increased appetite is often followed by anorexia, while excessive thirst is even more common. Nothing special is found on

examination. There are no parasites in the blood, but some punctate basophilia is frequently present. A very small rise of temperature, accompanied by slight rigors in the afternoon may occur. In his own case, the author was on the alert for this "aura," and at once took quinine. As a result, he has abandoned the use of the ordinary tedious and prolonged quinine prophylaxis. He has given the new method a six months' trial, and claims to have aborted attacks of malaria on three occasions. As soon as he recognizes the "aura," he takes 0·2 gramme of quinine. This is repeated twice on the first day, *i.e.* 0·6 gramme altogether. On the second day he takes 0·2 gramme on two occasions. In this way during the prodromal period he takes in all one gramme of quinine. During the half-year he supplemented this dosage by three grammes of quinine, and he remained exempt from any malarial attack. He also treated a series of Europeans whom he was able to watch closely in a corresponding manner, and with a similar gratifying result. He, therefore, considers that by watching for the prodromal symptoms, malarial attacks can be aborted by comparatively small doses of quinine. At the same time he cautions against the indiscriminate use of this method in the hands of laymen. It should be carried out under medical control.

Encouraged by these results, he has also tried treating cases of acute malaria by doses of 0·2 gramme of quinine, given thrice daily, and though he has few cases to record he finds the drug acts as promptly as when gramme doses are given.

A. B.

Rossi (Giacomo). **Risultati di una Inchiesta sulle Condizioni Malariche e sulla Lotta Agricolo-antimalarica nelle Provincie di Benevento, Caserta e Salerno.** [Results of an Inquiry into the Malarial Conditions and the Anti-malarial Campaign in the above-named Provinces.]—*Propaganda Antimalarica.* 1913. Oct. 31. Vol. 6. No. 5. pp. 107-115.

Analysis of replies to a set of questions sent out to the public authorities of the districts of Benevento, Caserta and Eboli in Campania, with a view to obtaining information as to the present state of the anti-malarial campaign in those districts, and the results obtained after ten years of official effort in combating malaria. The returns obtained were very partial, owing to the apathy of local officials. So far as they go, they seem to indicate that the Italian provincial quite appreciates the gratuitous distribution of quinine by the State, but that all sanitary works dependent upon local initiative, such as draining and cultivation of the soil, remain sadly in arrear. The paper is of local interest only, and makes rather melancholy reading from its pessimism.

J. B. Nias.

Kenrick (W. H.). **Malaria and Colour.**—*Indian Med. Gaz.* 1913. Dec. Vol. 48. No. 12. pp. 473-474.

The author thinks that the high degree of immunity to malaria possessed by the African negro is due to the high degree of skin pigmentation; he asserts that certain darkly pigmented aboriginal East Indian races possess a similar high degree of immunity. Amongst

the Korkus, Gonds and Baigas, aboriginal tribes inhabiting the forests of the Central Provinces of India, the fairer children are said to have a higher degree of splenic enlargement than the darker ones.

Where members of two tribes are found occupying the same village, those with darker skins will be found to possess a lower spleen rate, especially amongst the children, and the adults a lower fever rate.

The author thinks that malaria prevents the pigmentation of the skin which protects from sun exposure, and that therefore a malaria-infected subject is more susceptible to the heat of the sun's rays. He considers the observation supports the haemoglobin rather than the epidermal origin of skin pigmentation.

[No figures, statistics or experiments are given in support of these rather dogmatic statements.]

P. H. B.

CARTER (Henry R.). **Malaria in North Carolina.**—*U.S. Public Health Rep.* 1913. Dec. 19. Vol. 28. No. 51. pp. 2739—2760.

A survey of malaria prevalence in certain districts of North Carolina with a view to advising the health authorities of that State on the means to be taken for its control.

For this purpose thirteen towns were visited. Anopheline larvae were found in all but one. Suggestions for anti-mosquito measures were made in each town, and public lectures were delivered. It is interesting to note that Carter during his travels did not meet with a single physician capable of recognizing anopheline larvae. No definite statistics of the prevalence of malarial fever or its virulence in the different localities could be obtained, but apparently it is far less prevalent than 20–30 years ago. The increased prosperity of the country people and the lowered price of quinine are given as reasons for this diminution.

P. H. B.

LEGER (M.) & BOUILLIEZ (M.). **Recherches expérimentales sur *Plasmodium inui* Halberstädter et Prowazek d'un *Macacus cynomolgus*.**—*Ann. Inst. Pasteur.* 1913. Nov. 25. Vol. 27. No. 11. pp. 955-985.

The first part of the paper is practically a reprint of that reviewed in this *Bulletin*, Vol. 1, p. 26. The authors make a further contribution to the life history and pathogenicity of *Plasmodium inui*. This plasmodium, which much resembles *P. vivax*, produces sixteen merozoites and the degenerative condition of the red cell known as Schüffner's dots. It is pathogenic to several species of monkey, but the chimpanzee and the maki of Madagascar are refractory. In the infected monkeys the infection causes, curiously enough, hardly any rise of temperature.

Post-mortem examinations revealed no lesions save a pigmentation of the organs. Attempts to transmit the parasite to other animals, notably to lemurs, a group closely allied to the Primates, proved ineffectual. Quinine in large doses was given, but the authors were unable to decide whether it was prophylactic against infection; it was found to have no curative effect whatsoever.

Some interesting splenectomies on infected monkeys were performed; many died after the operation from causes other than the plasmodium, but as might have been expected removal of the spleen had no effect either on the numbers or morphology of the parasite. All attempts to cultivate the parasite by Bass's method failed.

The paper ends with a short paragraph on the differential diagnosis of the parasite. Four species of pigment-producing Plasmodium are known to occur in monkeys. *P. Kochi* (Laveran, 1899). *P. pitheci* (Halberstädter & Prowazek, 1907), *P. inui* (Halb. & Prow., 1907), (identical with *P. cynomolgi* Mayer), and *P. brasilianum* (Gonder & Berenberg-Gossler, 1908).

P. kochi has been found in nature in *Cercopithecus sabaeus, C. babuinus, C. albigularis, C. fuliginosus*—all African species. The development of the parasite takes place in from 24–50 hours. The schizonts resemble those of the benign tertian parasite and consist of 8–14 merozoites. The host cell is not hypertrophied; Schüffner's dots are present.

P. pitheci is found in the orang-outang of Borneo and cannot be transmitted to the lower apes. The young schizonts resemble those of the subtertian parasite; schizogony is complete in 48 hours; the cell host is not hypertrophied and contains degenerating granules more resembling Maurer's than Schüffner's dots.

P. brasilianum has been studied in *Brachyurus calvus* from the Amazon River. This haematozoon greatly resembles the quartan parasite (*P. malariae*). It does not hypertrophy the host cells at all, nor give rise to Schüffner's dots.

P. inui is found in monkeys of the genus Macacus. The schizonts contain 12–16 merozoites and development is complete in 48 hours. It is probably identical with the plasmodium described by Mayer from a *Macacus cynomolgus* imported from Java.

As a result of these researches, the authors are unable to place much reliance on such characters as Schüffner's dots and the size of the host cell in differentiating these parasites; such features were only inconstantly present in *Pl. inui*. They consider the pathogenic action as being much more reliable.

P. H. B.

BLACKWATER FEVER.

STEPHENS (J. W. W.). **Studies in Blackwater Fever.**—*Ann. Trop. Med. & Parasit.* 1913. Dec. Vol. 7. No. 4. pp. 479-507. With 2 charts.

A carefully reasoned paper* based on statistics compiled from numerous sources, and showing the close relationship existing between malarial infection and blackwater fever. The results certainly bear out the conclusion of CHRISTOPHERS and the author to the effect that blackwater is malarial in origin, but occurs only in those who are in a condition induced by repeated malarial infection lasting over a certain time. The subject is considered under the following headings: (1) malarial parasites; (2) pigmented leucocytes; (3) post-mortem examination; (4) influence of malaria; (5) relationship to species of malaria parasite; (6) effect of period of residence; (7) seasonal prevalence; (8) correlation between malaria and blackwater statistics; (9) second attacks. The strongest proofs are forthcoming under the headings (1) and (8), but well-nigh every one of them goes some way towards establishing the author's hypothesis, and he has had the advantage of having his figures checked by the Statistician of the Liverpool School of Tropical Medicine. The paper, which is full of interest, requires detailed study, the numerous tables and the two charts being specially worthy of attention, but a few points may be noted here. Under the first heading the record of 390 cases of blackwater is considered, and these cases are classified in three groups according as malarial parasites were found on the day before, the day of, and the day after the onset of blackwater. The tables show that on the day before haemoglobinuria occurred 73 per cent. of the cases exhibited parasites, on the day of the onset 47·5 per cent., and on the day after 23 per cent. The parasites, therefore, disappear during the course of the disease, a phenomenon which the author considers is in all probability due to the accompanying acute haemolysis. He admits, however, that it seems certain that relapses occur during the course of the disease without the occurrence of parasites in the blood.

As regards the question of pigmented leucocytes the figures given are small, and only suggestive. More observations are required in this connection. Post-mortem examinations of 31 cases showed malarial pigment present in 83·9 per cent. It was not found in five cases, a fact on which Stephens comments as follows:—

"If the absence of pigment P.M., supposing the facts correct, definitely excludes malaria then some blackwater cases must be due to other causes, which one must admit is not impossible, although I believe the facts prove that malaria is the dominant factor."

The question of the relationship to species of malarial parasites is considered in the light of figures culled from the observations of DEEKS and JAMES, and of LOVELACE. A discrepancy is apparent, as the former show that malignant tertian is the form chiefly associated with blackwater, while the latter indicates that it is chiefly associated with simple tertian infection. It would seem, however, that LOVELACE was dealing with a simple tertian parasite showing increased virulence.

* The substance of this paper was read before the Tropical Section of the International Congress of Medicine, 1913.

So far as figures are available they indicate that it is in the second year of residence in the Tropics that the greatest number of blackwater cases occur. Stephens believes that this is evidence of the part played by repeated malarial infection.

Lack of space prevents any detailed summary of the important section dealing with the correlation between malaria and blackwater fever statistics. The author chiefly relies on the returns for malaria and blackwater fever in the Panama Canal Zone and more especially on the record of admissions into Ancon Hospital, for here the data are classed according to race, and are available for each month over a period of five years. A chart shows the incidence of malaria and blackwater fever on "Americans" (intelligent; living under hygienic conditions; properly treated when attacked by fever; receiving pay when in hospital); "Europeans"—Spaniards, Italians and West Indian negroes (!) (those desiring it live in mosquito-proof houses; careless as regards individual prophylaxis; indifferent to personal hygiene; *receiving no pay when in hospital*); "Negroes" (badly housed no personal hygiene). It is in the "Europeans" who suffer severely from malaria that blackwater occurs. There is very little amongst "Americans" or "Negroes." Commenting on this the author says:

"Now it appears to me that the explanation is obvious, viz., that blackwater depends upon malaria. Of course it is possible to argue that the relationship depends upon the fact that we are dealing with two diseases both inoculated by the mosquito, or that those suffering from malaria are debilitated and so open to the attack of this hypothetical other disease, and even if for argument's sake we were to admit such hypotheses we should still be in the position that this disease affects those suffering from malaria. But we consider that the obvious explanation is the true one. And again, the figures lend no support to the view that there is a quinine haemoglobinuria distinct from blackwater fever, because, if so, we should expect it in the Americans—the quinine takers."

[It has been well said that statistics may be made to prove anything and, of course, one may reasonably ask if all the observations and records on which the author builds up his case are absolutely reliable. At the same time there can be no doubt that this paper is highly suggestive and is a very useful contribution to the literature. It should certainly be in the hands of all students of malaria and blackwater fever.]

A. B.

NAPIER (A. H.). **Is Syphilis a Factor in Blackwater Fever?**—*Indian Med. Gaz.* 1913. Oct. Vol. 48. No. 10. pp. 389-390.

The author concurs in the theory which regards syphilis as the cause of blackwater fever. He states that the latter is found in syphilitic cases giving a positive Wassermann reaction, the actual onset of the disease being brought on by chill, over-exertion, administration of quinine or an attack of malaria. He considers blackwater fever to be symptomatically indistinguishable from paroxysmal haemoglobinuria; indeed he regards the two conditions as practically identical, and notes that DICKINSON reports a history of malaria in 71 per cent. of his cases of paroxysmal haemoglobinuria. The author then proceeds to show from the literature on the subject that there is an apparent connection between syphilis and paroxysmal haemoglobinuria, and tries to trace a similar relationship between syphilis and the haemoglobinuria of blackwater fever.

He suggests that the Wassermann test should always be carried out in cases of blackwater fever [obviously an utter impossibility in the majority of cases] and, if positive, that salvarsan should be given.

[While syphilis may play a part in the etiology of some cases of blackwater fever, just as any other debilitating condition may do, it is very unlikely that it stands in any direct etiological relationship to it. The author has not considered his theory in the light of what is known about the geographical distribution of blackwater fever, and there are many other points against his argument. It seems to the reviewer that, with our present knowledge, it would be most undesirable to exhibit salvarsan in cases of blackwater fever even if they did happen to give a positive Wassermann test.]

A. B.

BARRATT (J. O. Wakelin). **Recent Experimental Research bearing upon Blackwater Fever.**—*Ann. Trop. Med. & Parasit.* 1913. Nov. 7. Vol. 7. No. 3B. pp. 367-369.

This short paper is a collection of references to such recent accounts of experimental work on blackwater fever as support the views which the author and YORKE advanced. These were to the effect that haemoglobinuria is preceded by haemoglobinaemia and that suppression of urine is due to mechanical blocking of the uriniferous tubules.

A. B.

BARRETO (Manuel Gomes). **Febre Biliosa Hemoglobinurica. Contribuiçao para o Estudo da sua Etiologia.** [Studies on the Etiology of Blackwater Fever.]—*Arquivos do Hygiene e Patologia Exóticas.* 1913. Oct. 31. Vol. 4. pp. 107-117. With 3 plates.

The first part of the paper is a resumé of STEPHENS's well-known work on this subject.

In Mossamedes, Angola, most cases of blackwater fever were found in the four months from February to June, and frequently at an elevation of 1,500–2,000 feet. The mortality from the disease in this district is a very small one. The author has studied the anopheline fauna of the endemic zone, and he thinks that this is a profitable line of research, as the endemic zone is a limited one and the species of mosquitoes are few. A large number of mosquitoes from this zone were despatched to Colonel ALCOCK of the London School of Tropical Medicine, who has identified *Anopheles costalis* as the most abundant species. The author thinks there is a connection between the distribution of this anopheline and blackwater fever.

He then studied the changes in the red cells and gives some very poor figures of alterations in the shape of the erythrocytes and of bodies resembling Babesia which he found in them. The paper closes with a history of eight clinical cases of blackwater fever observed by him.

[As far as one can judge, the observations on the changes in shape and composition of the red cells are not of much value.]

P. H. Bahr.

SLEEPING SICKNESS.

i. LE FANU (C. V.). **Sleeping Sickness in Togo.**
ii. WADE (W. M.). **A Report on Human Trypanosomiasis in the Western Province of Ashanti.**—Reports received at Colonial Office, Nov. 3, 1913.

i. In September 1913 Dr. C. V. LE FANU had an opportunity of visiting the sleeping sickness camp near Misahöhe in the German colony of Togo. The following is a summary of his report :—

A history is given of the disease in Togo and the administrative measures undertaken to combat it since 1903. In 1908 a sleeping sickness camp was established on the plateau of the Kluto, in the province of Misahöhe.

In this province the percentage of natives infected with sleeping sickness varied from a fraction to 5·9. A larger proportion of cases was found amongst men than women, and amongst adults than children. Two medical officers are engaged in sleeping sickness duty. The senior is responsible for the management of the camp and the treatment of the sick, whilst the junior is engaged in travelling in the province, periodically re-examining patients discharged from medical treatment "under observation," and in collecting new cases which he sends for treatment to the camp.

In September last there were 48 patients in the camp. The total number treated since 1908 is 593. Complete records are available for 355. The earliest cases were treated with atoxyl, the next with arsenophenylglycin, which during the last twelve months has been superseded by salvarsan and neosalvarsan ; these were given at first intravenously, later intramuscularly.

Details are as follows :—

(1) Atoxyl : A total of 15–20 injections up to ·5 gram. each, given every tenth and eleventh day :

No. of Cases.	Cured.	Per cent. cured.
52	30	52·6

(2) Arsenophenylglycin : Two injections on successive days, varying from ·04 gram. to ·06 gram. pro kg. of body weight :

No. of Cases.	Cured.	Per cent. Cured.
233	180	77

(3) Salvarsan :

No. of Cases.	Cured.	Per cent. Cured.
20	19	95

(4) Neosalvarsan :

No. of Cases.	Cured.	Per cent. Cured.
45	37	82

The most recent treatment practised by Dr. VON DER HELLEN is the following :—

(1) On three successive days, three times a day, 2 grams tryparosan.

(2) Next two days, three times a day, 1·1 gm. trypaflavin.

(3) The following day and again two days later, intramuscular injections of neosalvarsan ·025 gm. per kg. of body weight. No records for this last form of treatment are available.

It appears that by far the greater number (95 per cent.) of relapses occur within the first four months after commencenent of treatment. The period of detention in camp is not less than six months, and often as much as, or more than, twelve. Patients "discharged as under observation" are required to report for examination at least once every third month.

ii. Dr. W. M. Wade was appointed in December 1912 to investigate the condition of sleeping sickness in Ashanti, and to compare the present state of affairs with that obtaining in 1910. (See Dr. KINGHORN's report summarised in the *Sleeping Sickness Bulletin*. Vol. 3, p. 133).

A description is given of the country and of the inhabitants, who may be divided into two classes:—(1) the householders and their dependents; (2) the floating population. Many of the latter have travelled great distances; they are as a rule wild, wear little clothing, and are inclined to run away at the approach of a white man, which renders thorough examination of them extremely difficult. The author believes that this class constitute the chief carriers of sleeping sickness in Ashanti.

A list is given of the various tsetse flies caught during the journey. These include *G. palpalis*, *G. pallicera*, *G. longipalpis*, *G. fusca*, and *G. nigrofusca*. The author repeatedly searched for tsetse pupae, but without success.

Writing on the distribution of the disease, Wade states that in his opinion the disease follows the main trade routes and traffic, and that residents becoming infected in the villages on the main roads act as reservoirs for disseminating the disease to susceptible persons in neighbouring villages. The more remote the villages were from the main roads the fewer were the number of infected found.* The routine examination practised was precisely the same as in previous years; namely, house to house visitation, examination of all the inhabitants for glandular enlargements, and puncture of any suspicious glands. The indigenous population gave little trouble as regards examination. Among 39,742 natives examined, 110 (23 old and 87 new) cases of sleeping sickness were found. The new cases (49 males and 38 females) comprised 36 pure North Country natives, 11 Ashantis with a North Country strain, 17 Gamans, 1 Timminy from Sierra Leone, and 22 Ashantis (probably not all these were pure Ashantis).

At least 20 of the 97 cases found in 1910 are still alive, and nine at least of the 32 found in 1911-12. On going through these cases it is noticeable that, in the absence of treatment, North Country natives seem to succumb to the disease more quickly than the indigenous natives.

There are two kinds of cattle seen in this Province, viz., the North Country Moshi cattle, brought to the country to be slaughtered, and the small cattle indigenous to the Province, called Gaman cattle. The former on their arrival are in excellent condition, but soon become thin, and in the author's experience, are constantly infected with trypanosomes, whilst the small indigenous cattle thrive and breed in the province.

As a prophylactic measure it is recommended that 100 yards clearings be made around all villages and zongos on the main trade roads and around all bush villages where there are cases of sleeping sickness, and that these clearings when made be properly maintained; and 50 yards clearings around the water supplies and working places of all these villages. Segregation of infected cases is impracticable;

*KINGHORN wrote of Ashanti that the disease was as commonly found in villages off the beaten tracks as in those situated along the highway. A.G.B.

even in the case of infected residents it could only be carried into effect by the use of strong measures, and there would always remain the floating population, which is probably the greatest danger as a reservoir of the infection.

The author believes that the new roads which are at present being made through the forest constitute a danger as regards trypanosomiasis. Moving objects seem to be a greater attraction for tsetse flies on these broad sunlit roads than in the dark ones, whilst on each side of the roads, where the forest has been cleared back for a few yards, there is now a tangled mass of moisture-laden vegetation, shaded by the branching trees and forming an ideal habitat for tsetse flies. If railways could be run through the endemic areas where North Country natives are employed in large numbers, Wade believes that there would quickly be a diminution in the North Country population and also in the incidence of the disease.

W. Yorke.

Sant'ana (J. Firmino). **A Tripanosomíase Humana da Rhodésia Crónica e particularidades da Epidemia, no que interessa ao Território Português da Africa Oriental.** [Human Trypanosomiasis of Rhodesia; the History and Details of the Epidemic, as far as concerns the Territory of Portuguese East Africa.]—*Arquivos de Higiene e Patologia Exóticas.* 1913. Vol. 4. pp. 3-50. With 1 map.

In the latter part of this paper the author describes the precautions which are being taken to prevent the spread of sleeping sickness in Portuguese East Africa. The necessary insect is present in *Glossina morsitans*, which has been discovered at various points near the course of the Zambesi. *G. pallidipes* and *G. fusca* are also to be found near the coast. Consequently, it only requires the introduction into the colony of infected human beings for the disease to become prevalent.

As can be seen from the map, the north-west portion of Portuguese East Africa projects into Rhodesia between Nyasaland and the Salisbury district, and there is a constant traffic of natives across this neck of land, in the neighbourhood of Tete. As sleeping sickness is known to prevail on the western shore of Lake Nyasa, and also along the river Luangwa in Rhodesian territory, the situation is described as full of danger for Portuguese interests. A sanitary service for inspection and control is consequently being set up in this district by the Portuguese Government.

Sleeping sickness also exists in German territory, close to the Portuguese boundary, which is formed by the river Rovuma. *G. morsitans* being plentiful in Portuguese territory just south of this river, precautions in this quarter are also indicated.

Only four cases of sleeping sickness have so far been recognised within the territory of Portuguese East Africa, and of these particulars are given.* The infection could be traced in every instance to residence within Rhodesian territory, at places where the disease was known to exist.

J. B. Nias.

* The case of the elephant hunter who was infected in Portuguese territory is not mentioned (see *Sleeping Sickness Bulletin*, Vol 4. p. 266). A. G. B.

Van den Branden (F.). **Note préliminaire sur quelques Essais de Traitement de la Trypanose Humaine par Salvarsankupfer.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 24. pp. 845-849

In this paper a preliminary account is given of the therapeutic action of Salvarsankupfer ("K3") in sleeping sickness. This drug, which was obtained from Ehrlich, is a combination of salvarsan and copper. Directions for its administration are given. It is more active than salvarsan, but at the same time more toxic. Ehrlich recommends that not more than 0·05 gm. should be given; the author however administered larger doses, up to 0·3 gm.

The drug was found to clear the gland juice of trypanosomes within five minutes, even when given in doses less than 0·005 gm. per kilo of body weight. It was easily tolerated by infected natives. Two patients out of 35 vomited about three hours after the injection, but this gastric reaction was transient. There was usually a slight febrile reaction to 37·5° C; no albuminuria was observed. One patient died of arsenical poisoning three days after treatment; at the post-mortem examination acute yellow atrophy of the liver was found; the amount of drug given in this case was 0·005 gm. per kilo of body weight. The general condition of the patient at the time of injection was good, the nervous system not being invaded by parasites. Other patients tolerated larger doses of the drug (·006 gm. per kilo). It appears that 0·005 gm. per kilo is a dose which should be not exceeded.

The results of treating 14 patients with various doses of the drug are given in tables. Three patients received at a single injection 0·1 gm. of the drug; two of these relapsed after a month, whilst in the third trypanosomes had not reappeared up to the 72nd day. Two patients who received two consecutive injections of 0·1 gm. had not relapsed three months later, nor had two others who received a single injection of 0·2 gm. Of two cases who received three consecutive injections of 0·1 gm. one relapsed after a month, whilst the other was still negative at the end of two-and-a-half months. Five patients received a single dose of 0·3 gm; one relapsed on the 45th day, the others were still negative on the 82nd, 81st, 75th and 76th days respectively.

The author points out that the periods during which the cases were under observation is short; he intends to give the ultimate results in a future paper.

Ehrlich informed the author that the drug with which these experiments were performed was manufactured on a large scale, and is less active than that previously prepared in small amounts. He is to supply a further quantity of freshly prepared "K3," with which the author intends to repeat his experiments.

W. Y.

Balfour (Andrew). **Recent Views on Syphilis, Spirochaetes, and Sleeping Sickness** [Correspondence.]—*Brit. Med. Jl.* 1913. Dec. 13. pp. 1560-1561.

The major part of this paper is occupied with a discussion of the possibility of finding a substance capable of acting as a "carrier" for drugs used in the treatment of syphilis. The need is to find such a carrier in order that drugs used may reach the cytoplasm of the spore

or granule phases of the syphilis organisms, and bring about their destruction.

The action of urotropin as a trypanocide is now being tested in cases of sleeping sickness in the Southern Sudan. As it readily penetrates the spinal membranes, the drug may be of service as a "carrier," even if it has no direct trypanocidal action.

H. B. Fantham.

GROSSULE (Virgilio). **Esperienza sulle Scimmie col Siero Mehnarto contro la Malattia del Sonno.** [Experiments on Monkeys with Mehnarto's Sleeping Sickness Serum].—*Gazz. d. Ospedali e d. Cliniche.* 1913. Oct. 23. Vol. 34. No. 127. p. 1327.

In 1912, some tubes of serum prepared by Dr. MEHNARTO, for use in sleeping sickness were forwarded by a colleague of the author, with a request that he should experiment with it in the hospital at Stanleyville. A description of the appearance of the serum is given, and the instructions for use accompany it. It was tried on two monkeys which had been inoculated from two patients infected with *T. gambiense*. Intramuscular and subcutaneous injections had no effect on the parasites. The conclusion is that MEHNARTO's serum, the composition of which is not stated by him, has no power against the trypanosomes of sleeping sickness, and cannot be injected intravenously as Mehnarto advises, on account of the flocculi suspended in the liquid.

W. Y.

BLACKLOCK (B.) & YORKE (W.). *Trypanosoma vivax* **in Rabbits.** —*Ann. Trop. Med. & Parasitol.* 1913. Dec. 30. Vol. 7. No. 4. pp. 563-568.

The trypanosome with which this article deals was isolated from a horse naturally infected in the Gambia (*Sleeping Sickness Bulletin*, Vol. 4, p. 68). From that time (June 14, 1911) up to the present, the strain has been preserved by passage through a series of 39 goats. In spite of direct inoculation of the trypanosome from goat to goat, during a period of nearly two and a half years, no appreciable increase of virulence was observed. The average duration of the disease in the first 14 animals was 31 days, whilst that in the last 14 was 29 days.

Attempts to infect rabbits, made in the earlier passages of the strain through goats, either failed entirely or resulted in a temporary infection in which the parasites were exceedingly scarce and disappeared after a few days. It was not possible to carry on the strain to a second generation in rabbits.

Inoculations made from the 38th goat proved, however, more successful, and four rabbits injected intraperitoneally with small amounts (0·5 to 1 cc.) of the goat's blood all became infected after incubation periods of five to eight days. The infection in all was well marked, and as many as twenty parasites to the microscope field were seen in the peripheral blood. Sub-inoculations were made from one of these rabbits, with positive results. The strain was carried on in rabbits over a period of more than three months, until the eighth generation. Details are given in a table.

Although the strain has not yet become invariably pathogenic for rabbits, nevertheless most of the animals inoculated developed a

definite infection, and in five the disease ran an acute course, the animals dying in from 5 to 20 days with numerous parasites in the peripheral blood.

As a general rule this trypanosome in rabbits did not exhibit the rapidity of movement which is characteristic of it in goat's blood. In stained preparations the parasites were identical with those seen in goat's blood. H. B. F.

Blacklock (B.) & Yorke (W.). **The Probable Identity of *Trypanosoma congolense* (Broden) and *T. nanum* (Laveran).**—*Ann Trop. Med. & Parasitol.* 1913. Dec. 30. Vol. 7. No. 4. pp. 603-607.

The authors regard *T. dimorphon* (sensu Laveran and Mesnil), *T. confusum* (Montgomery & Kinghorn), and *T. pecorum* (Bruce) as synonymous with *T. congolense*. They point out that the sole distinguishing feature of this parasite from *T. nanum* (Laveran) is one of pathogenicity, *T. congolense* being described as pathogenic for monkeys, dogs, rabbits, guinea-pigs, rats and mice, while *T. nanum* is considered to be incapable of infecting these animals.

An account is given of the manner in which various animals reacted to a short aflagellar trypanosome—indistinguishable morphologically from *T. congolense* or *T. nanum*—from the time of its isolation from a naturally infected horse [see *Sleeping Sickness Bulletin*, Vol. 4 pp. 68, 228] until the strain had been passed through a series of 51 laboratory animals during a period of 18 months. Details are set forth in a table. A study of this table reveals two facts:—(1) Most of the early inoculations failed to infect, whereas the later were invariably successful; (2) the course of the infection in the earlier cases was chronic, whereas that in the later instances was acute. The average length of life of the first ten rats, from the fifth generation to the fourteenth, was 88·6 days, while that of the last ten rats, comprising the 42nd to the 51st generation, was only 8·6 days. By passage through laboratory animals the trypanosome was changed from one of uncertain and chronic pathogenicity to one of great virulence. The authors point out that one or two sub-inoculations from a naturally infected animal may not afford any conclusive evidence as to whether or not the trypanosome is pathogenic for small laboratory animals. Had the number of their experimental animals been limited, they would probably have designated this parasite *T. nanum*. Further experiments, however, showed that the trypanosome could be made acutely pathogenic to small laboratory animals.

Reference is made to the variation in virulence of other strains of short aflagellar trypanosomes, noted by Weissenborn and the Sleeping Sickness Commission of the Royal Society.

In conclusion, the authors write: "We can see no evidence which would justify distinguishing one from the other on the ground of pathogenicity. In the present state of our knowledge we can only conclude that *T. congolense* and *T. nanum* are the same parasite." H. B. F.

Pringault (E.). **Existence en France du *Trypanosoma vespertilionis* Battaglia.**—*Compt. Rend. Soc. Biol.* 1913. Dec. 26. Vol. 75. No. 37. pp. 663-665.

The author found a heavy infection of *Trypanosoma vespertilionis* in

a young bat, *Vesperugo kuhli*, captured in the neighbourhood of Marseilles. Most of the trypanosomes were small, about 17μ long. It was found possible to keep some of the parasites alive for five days in a fresh preparation, luted with paraffin. The behaviour of the parasite at different temperatures was investigated. This is the first record of the trypanosome in France. H. B. F.

Mesnil (Felix). **Sur le Nagana de l'Ouganda.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 685-689.

Reference is made to the work of Bruce, Hamerton, Bateman and Mackie, indicating that the trypanosome found by them in a Uganda ox in 1909 is identical with that with which Bruce worked in Zululand 15 years previously, and to the work of Stephens and Blacklock, showing that the Uganda trypanosome differs from the monmorphic parasite sent to England by Bruce, and described by Plimmer and Bradford as *T. brucei*.

The author considered that it would be of advantage to submit the two trypanosomes (of Zululand and of Uganda), the identity of which is a matter of dispute, to biological tests. Laveran has already shown that two sheep immunised against nagana (var. ferox) were as susceptible to *T. rhodesiense* as normal sheep. [See *Sleeping Sickness Bulletin*, Vol. 4, p. 135.]

Three goats were inoculated, the first with the virus of Uganda, the second with a trypanosome of the *brucei* type, and the third with nagana (var. ferox), in order to compare the first two parasites and incidentally to show the affinities of nagana ferox with the nagana type. As the first two goats died from the infection, the crossed immunity tests could not be undertaken. The third goat recovered not only from its infection of nagana ferox, but also from an infection of the nagana type (or mixed infection ?). When subsequently inoculated with the Uganda virus this goat became ill and died ; hence the author concludes that the Uganda virus is distinct from that of nagana. During the course of the infections the goats were bled frequently, and the protective action of the sera examined as regards the three trypanosomes. The serum of the animal infected with the Uganda trypanosome did not protect mice against the nagana trypanosome, and conversely that of the goats infected with nagana did not protect mice against the Uganda virus. The reactions done with nagana and nagana ferox were, in general, positive indicating the identity of the two. These experiments suggest that the virus of Uganda is different from nagana ; it must rather be compared with *T. rhodesiense*. W. Y.

Macfie (J. W. Scott) & Johnston (J. E. L.). **A Case of Equine Trypanosomiasis characterised by the Occurrence of Posterior Nuclear Forms**—*Jl. Trop. Med. & Hygiene.* 1913. Nov. 15. Vol. 16. No. 22. pp. 348-349. With 1 text fig.

Attention is drawn to the fact that with the exception of the parasite found by Macfie in a horse infected in Northern Nigeria [see this *Bulletin*, Vol. 1, p. 674], the occurrence of trypanosomes exhibiting posterior nuclear forms has not been described from West Africa.

In this paper an account is given of a trypanosome infecting two horses at Accra, Gold Coast. The parasites were found to be of the *T. brucei* (*pecaudi*) type. Numerous trypanosomes were present in the slides made from the blood of one of the horses, and examination revealed the presence of 4·8 per cent. of definitely posterior nuclear forms. This species is probably that for which Stephens and Blacklock proposed the name *T. ugandae* [see this *Bulletin*, Vol. 1, p. 662], considered by some to be identical with *T. pecaudi*. The authors believe that this trypanosome is a common parasite of domestic animals in the West African Colonies. If it is identical with *T. rhodesiense*, it is a curious fact that human trypanosomiasis in West Africa appears to differ materially from that in Rhodesia. Again, if *T. rhodesiense* is *T. brucei* (*pecaudi*), we might be expected to find cases of *T. rhodesiense* infection in man in places where *T. brucei* is common in domestic stock, but this is not the case. The trypanosome from a case of sleeping sickness in Southern Nigeria was studied; neither in its measurements, its morphology, nor in its animal reactions did it resemble *T. brucei* (*pecaudi*) or *T. rhodesiense*.

W. Y.

Sant'ana (J. F.). **Observações sôbre as Forms não Flageladas do *Trypanosoma rhodesiense* nos Animais de Experiencia e em Especial no Rato.** [Observations on Non-flagellar Forms of *T. rhodesiense* in experimental Animals.]—*Arquivos de Higiene e Patologia Exoticas*. 1913. Oct. 31. Vol. 4. pp. 77-105. With 3 coloured plates.

The author gives first a long historical resumé of the work relating to plasmodial, encysted, and intracellular forms of trypanosomes, the latent bodies of Moore and Breinl, and various resistant and multiplicative stages of many different trypanosomes as observed by numerous workers. The strain of trypanosomes used by him was obtained from Tete, Portuguese East Africa, near the Rhodesian frontier. It had the morphological features of *T. rhodesiense*, and the flagellate showed the characteristic polymorphism, long, stumpy, and posterior nuclear forms being observed. Sub-inoculated animals were very sensitive to the virus.

Rounded forms of the trypanosome were seen in the circulating blood and in the internal organs. They were most abundant in the organs at the periods of minimum numbers of trypanosomes in the peripheral blood. Amoeboid, nonflagellate forms were seen in the lungs and less frequently in the liver and spleen. Intracellular, rounded forms were observed in polynuclear leucocytes and myelocytes in the spleen, liver and bone-marrow. Apparently they were in process of phagocytosis.

The rounded body often contained a nucleus but no blepharoplast; at other times a blepharoplast was present. An outer sheath to the rounded body, suggestive of a capsule or cyst membrane, was said to be formed by the remains of the undulating membrane. The illustrations show many forms with chromatinic fragmentation, and some with vacuolated protoplasm.

The author considers that the rounded forms of *T. rhodesiense* observed by him result from partial degeneration of the flagellate forms, and states that they "show notable analogies with the involutive phenomena seen in dying animals or those a short time dead." [It is obvious from the description of the phenomena of formation of these rounded bodies, and from careful inspection of the accompanying plates, that the non-flagellate forms are rightly described by the author as degeneration forms. They are certainly not identical with true, latent, leishmania-like or evolutionary (cyclical) forms described by other workers.]

H. B. F.

PARPARCONE (Ernesto). **Ricerche Sperimentali sul Nagana. IV Communicazione. Lesione occulari per infezione generale da** *Trypanosoma brucei*. [Ocular Lesions in General Infection with *T. brucei*]. —*Sperimentale*. 1913. Dec. 17. Vol. 67. No. 6. pp. 933-942.

In guinea-pigs and rats the development of the disease was so rapid that the ocular lesions and lesions of the nervous system were not developed. In rabbits and dogs, however, in which the disease was more chronic, ocular lesions were constantly observed. The eyelids, corneae, and aqueous humour were all affected. The conclusions are :

1.—In experimental infection with *T. brucei* (Nagana) in rabbits and dogs, the eye tissues show changes : blepharitis, conjunctivitis, very intense and diffuse parenchymatous keratitis, irido-cyclitis, choroiditis, etc.

2.—Trypanosomes are present in the conjunctival secretion and in the aqueous humour, as shown by stained preparations, and injection into animals.

3.—They are also demonstrable in the cornea, both at the first onset of the keratitis when the cornea is still transparent and devoid of blood vessels and when the keratitis is very marked. The interstitial lesions of the cornea are due to proliferation of the parasites in the corneal parenchyma, and to their toxic products. One can produce keratitis with extracts of trypanosomes.

4.—The aqueous humour of animals infected by various routes contains trypanosomes ; one can infect animals by injecting trypanosomes into the anterior chamber.

W. Y.

GORETTI (Guido). **Ricerche Sperimentali sul Nagana. III Communicazione. Contributo allo Studio delle Alterazione del Sistema Nervoso Centrale nell'Infezione sperimentale da Nagana.** (*Trypanosoma brucei*). [The Study of Alterations of the Central Nervous System in Experimental Infection with Nagana (*T. brucei*.]—*Sperimentale*. 1913. Nov. 13. Vol. 67. No. 5. pp. 527-564.

The author gives an account of the work of other investigators. He examined the nervous system of many rats, eight guinea-pigs, six rabbits, and five dogs, and in the present paper gives an account of his findings in detail, with the technique adopted. His conclusions are as follows :—

In rabbits, guinea-pigs and dogs experimentally infected with nagana, serious changes in the central nervous system are :

1.—Marked chromatolysis of the cellular elements generally.

2.—Moderate infiltration of plasma cells and lymphocytes in the meninges and around the capillaries of the central nervous system ; similar elements are found also free in the lumen of the vessels. Besides this a moderate number of "Stäbchenzellen" are scattered here and there in the nervous system, especially in the brain of dogs.

3.—Diffuse lesions—demonstrable by methods I of DONAGGIO, and MARCHI—affecting the myeline fibres of the brain, of the various tracts of the spinal cord, of the bulb, of the pons, of the mesencephalon, of the spinal nerve roots, and of the cranial nerves.

4.—Sometimes more advanced lesions of a bilateral character are demonstrable by the method of WEIGERT, in the crossed pyramidal tracts. Such lesions may also affect in a lesser degree the posterior nerve roots and the posterior tracts of the cord itself when the lesions of the pyramidal tracts are more extensive.

5.—A proliferation to a slight degree of the neuroglia.

6.—Such lesions are at least partly secondary in nature and in all probability are due to toxic products set free by the trypanosomes, toxic products which are seen to have a powerful and deleterious effect on the central nervous system.

W. Y.

LEVADITI (C.) & MUTERMILCH (St.). **Recherches sur la Production des Anticorps chez les Animaux Trypanosomiés et traités par le Salvarsan.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 699-704.

The serum of rats infected with nagana and treated by intraperitoneal injection of salvarsan was found to be trypanocidal *in vitro* shortly (two hours) after the administration of the medicant. This trypanocidal action is not due to a true antibody, as instead of being inactivated by heating to 55° C. it becomes, on the contrary, intensified. It is probably to be explained by the circulation in the blood of salvarsan or some derivative of it. This property diminished in proportion to the length of time which elapses after the injection of the drug, and disappears altogether after about 30 hours.

The true antibodies appear in the blood about the fifth day after inoculation of the virus, and the time is unaltered whether the drug is given at the beginning of the infection, when parasites are very few, or later, when they are exceedingly numerous. The antibodies make their appearance on the day which corresponds with the crisis which occurs spontaneously in untreated animals (*i.e.* in those animals which exhibit such crises, *e.g.* guinea-pigs and rabbits). It seems as if the organism responds to the stimulus of the antigen and manufactures defensive substances, which appear after a period of incubation which is always the same. The setting free of a considerable mass of antigen following the destruction of the trypanosomes by a drug hardly influences the genesis of the antibodies ; it neither accelerates their appearance nor increases their intensity.

Details of the experiments upon which these conclusions are based are given in tables.

W. Y.

LAVERAN (A.) **Trypanotoxines. Essais d'Immunisation contre les Trypanosomes.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 693-698.

An attempt was made to confirm the work of SCHILLING and RONDONI [see this *Bulletin*, Vol. 2, p. 356], which showed that heating trypanosomes of nagana to 37° C. for some hours gave rise to the formation of a toxin, capable of killing mice in 24 to 48 hours. This toxin is thermolabile, being destroyed by heating to 56° C. for 30 minutes. Inoculation of small sublethal doses of the mixture, heated to 37° C., produced immunity against nagana.

Laveran gives details of two experiments made by him with the strain nagana ferox of EHRLICH in his attempt to corroborate the work of SCHILLING and RONDONI; the results obtained by him were, however, quite different. Of 29 mice which had been injected with ·25cc. to 1cc. of the trypanosome bouillon mixture heated to 37° C. for one and a half to five hours, not a single one died, or even presented morbid symptoms attributable to a slight intoxication.

It is noted that the length of time necessary to heat at 37° C. in order to destroy the virulence of the trypanosomes is very variable; in some cases two and a half to three hours is sufficient, whilst in others four to five hours is insufficient.

A number (15) of mice, which had survived the injection of the heated trypanosome bouillon mixture, were inoculated seven to eight days later with a small dose of the virus of nagana; all died of the disease within six days.

Laveran points out that these results agree with those obtained by most other workers who have endeavoured by the inoculation of the dead parasites to produce immunisation against trypanosomes. After briefly reviewing the literature of the subject, he concludes by stating that efforts to immunise by means of dead trypanosomes, when they have not been absolutely negative, have given merely partial and incomplete results.

W. Y.

STOLOWSKY. **Bericht über einen Versuch zur Ausrottung der *Glossina palpalis* durch Wegfangen.** [An Attempt to Exterminate *Glossina palpalis* by Capture.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 24. pp. 856-860.

The author points out that for an experiment of this kind an island is needed which is not visited by boats nor near enough to other Glossina-infested land to permit of the approach of *palpalis* by flight. The small rocky island of Kamanda, near Kirando, on the eastern shore of Lake Tanganyika, corresponded to these conditions. This had been uninhabited for years, was not visited by fishermen, and was removed from the nearest inhabited island by about half a mile. Kamanda is described as an island which takes 15 minutes to go round; it is covered with bush vegetation. The conditions were unfavourable for the experiment, because the shore was strewn with large rocks, amongst which the fly could find shelter and where the fly-catchers could not reach them. The island was visited almost daily by two fly-catchers and the spoils were counted in the evening. Between

August 1912 and April 1913, that is, about eight months, 6,165 *palpalis* were caught, 4,844 male and 1,321 female; that is, 3·5 male : 1 female. The most favourable results were obtained in August, when the catch averaged 100 flies and more; in November to January it was 10 to 20; afterwards it increased again. A fortnight after the close of the operations a single practised fly-catcher caught 43 flies, and later two fly catchers caught 86. It is seen that the flies had not been notably diminished, much less exterminated. The author thinks the experiment might have succeeded had there been less shelter for the flies, but that the clearing of vegetation is a simpler and more rapid method.

He notes that twice as many flies were caught in the morning as in the afternoon. He remarks on the large number considering the few opportunities of obtaining food. There were no warm-blooded animals except birds, unless perhaps a few small rodents; blood, he thinks, was supplied almost exclusively by crocodiles. The gut contained in a large percentage "sexual" forms of the crocodile trypanosome, *T. grayi* Novy. Finally he notes the existence of an island on which the conditions appeared eminently favourable for *G. palpalis*, but where this species was not found. This island, called Muila, which resembled Kamanda, was about 300 metres from another island, Kilenge, on which there was an abundance of *palpalis*. There was regular traffic between Kilenge and Muila, and goats were pastured here. This island, like all similar ones on Tanganyika, abounds in crocodiles.

A. G. B.

Torres (Margarinos). **Molestia de "Carlos Chagas." Transmissao do** *T. cruzi* **pela Picada do** *T. megista*.—[Chagas's Disease. Transmission of *Trypanosoma cruzi* by the Bite of *T. megista*.] —*Brazil Medico.* 1913. Aug. 15. Vol. 27. No. 31. p. 321.

A preliminary note in which the author announces that he has succeeded in infecting kittens with *T. cruzi* by the bite of the *barbeiro*. The insects were confined in narrow glass tubes, one in each, the mouth of the tube being closed with gauze. All infection of the kitten by the faeces of the *barbeiro* was thus prevented, the insect merely thrusting its proboscis through the mesh of the gauze. Of 35 different insects thus tested on the same number of kittens, 19 gave a positive result, and 13 a negative.

J. B. N.

Neiva (Arthur). **Transmissao do** *Trypanosoma cruzi* **pelo** *Rhipicephalus sanguineus* **(Latr.)** (Nota prévia). [Transmission of *T. cruzi* by *R. sanguineus*.]—*Brazil Medico.* 1913. Dec. 8. Vol. 27. No. 46. p. 498.

A dog which had been sent to the Oswaldo Cruz Institute, after having been experimentally infected with *T. cruzi*, was found to be in addition naturally infected with *Piroplasma vitali*. In due course of time it died, and upon its body were found five ticks of the species *Rhipicephalus sanguineus*. These were collected and placed upon another dog, previously ascertained to be healthy, in order to see

whether *P. vitali* could be thus transmitted. Instead, it was found, about a fortnight afterwards, that the dog was infected with *T. cruzi*. As it does not seem to have been hitherto shown that ticks can convey trypanosomes, the author thinks the observation worth putting upon record. The tick in question is common upon dogs in Brazil, and also, according to NEUMANN, is parasitic on man.

J. B. N.

BOOK REVIEW.

MEDIZINAL-BERICHTE **ueber die Deutschen Schutzgebiete (Deutsch-Ostafrika, Kamerun, Togo, Deutsch-Südwestafrika, Deutsch-Neuguinea, Karolinen, Marshall- und Palau-Inseln und Samoa) für das Jahr 1910/11. Herausgegeben vom Reichs-Kolonialamt.** [German Colonial Medical Reports for the year 1910-1911.]—xii + 808 pp. With 29 text-figs. and 5 plates. 1913. Berlin: Ernst Siegfried Mittler u. Sohn. [Price not stated].

German East Africa.—The European population of German East Africa numbers about 4,500, which include 200 troops; their death rate was 21 per thousand. The coloured population amounts to seven and three-quarters millions. Malaria is prevalent and causes about one-third of the total sickness, but only one-sixth of the mortality. Among the white inhabitants there were recorded 1,048 attacks of malaria and seven deaths, and also 56 admissions and eight deaths on account of blackwater fever. Tanga and Daressalam are both highly malarious; 76 per cent. of the Europeans in the former and 48 per cent. in the latter being the rates of incidence; 25 cases of blackwater fever with six deaths occurred in these two localities. At Tanga, 29 per cent. of adult natives and 43 per cent. of the children were malarial carriers; at Daressalam, 15 per cent. of the European adults, 23 per cent. of their children, and 21 per cent. of the natives were carriers. The malignant tertian parasite is found in the large majority of instances. Among the blacks, 26 cases of blackwater fever with four deaths were reported. Wilhelmstal, which is at an altitude of 1,450 metres, is free from malaria.

Experiments with the Azolla water-weed for the suppression of mosquitoes failed, since its growth is too slow. "Schnaken-Saprol" is cheaper and better than petroleum for the destruction of larvae. About five per cent. only of the whites take quinine prophylactically.

Along the south of Lake Victoria sleeping sickness is not endemic, but north of the island Meissome *Glossina palpalis* is common, and four human trypanosome carriers were found. Three thousand five hundred and seventy-three cases of sleeping sickness were under treatment, 673 of whom are recorded as having recovered, and 480 died. No Europeans were attacked. Two thousand five hundred and seventy-five cases and 274 deaths occurred on the shores of Lake Tanganyika. In the Bukoba district there were 524 cases and 89 deaths, and in Schirati 474 cases and 117 deaths. Atoxyl is the best remedy; given in doses of 0·5 gm. every fortnight until 8 gm. have been administered, the infection becomes quiescent. By-symptoms developed in a small proportion of the cases only. Unfortunately, in most of the patients, trypanosomes reappeared. Atoxyl combined with mercury or antimony has yielded no better results. Of 35 people treated with arsenophenylglycin, 16 died, six from the effects of

the remedy; only one seemed to be benefited. A Director and eight Sanitary Officers and 16 Assistants were employed on Sleeping Sickness duty, and 320,000 marks were expended.

There were 560 cases of smallpox with 163 deaths among the natives, but the Europeans were exempt. In the years 1909-1911, 1,753,278 vaccinations were performed, or 22·7 per cent. of the population were vaccinated. The lymph used for this purpose was mostly prepared locally. A calf was inoculated with pus of smallpox, and after two passages the lymph was employed as vaccine. Glycerine was added as a preservative. Passage through a pig or donkey restores the activity of the vaccine if this has been lowered.

Plague broke out at Lindi and Muansa, but only 18 attacks and 15 deaths were reported. 193,783 rats were examined; there was no *M. rattus* among them, but the *Mus decumanus* is a domestic rat in German East Africa. Rat-plague was discovered in both Lindi and Muansa. *Xenopsylla cheopis* was present in 87 per cent. of 92 rats examined, but their number was not great.

Relapsing fever is prevalent, and is transmitted by the *Ornithodorus moubata*. There is little enteric fever in the colony; only 30 cases and one death occurred in the Europeans. Dysentery caused 50 admissions and two deaths among them, and is prevalent among the natives; the amoebic form is more common than the bacillary.

Filariasis is endemic; 50 per cent. of the natives of the Bukoba district harbour *F. perstans*.

Worms and yaws are the causes of much sickness. Ankylostomiasis is extending from the coast inland. At Lindi, 20 per cent. of 3,243 natives were carriers. Tapeworm is common in both Europeans and Blacks. Bilharzia occurs, and in the vicinity of Massassi almost every child is infected.

In parts, 50 per cent. of the inhabitants are syphilitic. Goitre is frequently seen in the hilly districts.

Tick-borne diseases cause great mortality in stock. Coast fever, Texas fever, and piroplasmosis of horses, mules, dogs and asses are prevalent. Trypanosomiasis of these animals also occurs. A disease resembling rinderpest in many respects is extending in parts. Fowl cholera and avian diphtheria are present in several districts.

Kamerun.—Of the 1,405 Europeans in Kamerun, 29 died. Malaria was the chief cause of sickness, and gave rise to 151 admissions. Thirteen attacks of blackwater fever, which all ended in recovery, are recorded. The rainy season, May to October, is the most unhealthy time of the year, when malaria and dysentery are epidemic. The malarial index of some districts is as high as 70 per cent., and an altitude of 1,400 metres affords no immunity.

Vaccination is doing much to stamp out smallpox, which was rampant in years past; only 18 cases are reported. 122,340 vaccinations with lymph, prepared locally, were performed, with success in 70 per cent.; vaccine obtained from Germany gave 90 per cent. of failures.

Leprosy is common among the natives, but they resist all measures for its prevention. A leper home has been established at Jaunde, and 262 lepers have been treated.

Filariasis, ankylostomiasis, venereal diseases, and yaws are widespread.

An outbreak of sleeping sickness occurred at Akonolinga, where 230 cases were collected in a month. The infected area, a chart of which is given, lies on the banks of the river Dume and its tributaries. Since the sleeping sickness camp was opened 416 patients have been treated, by atoxyl chiefly; 37 recovered apparently. Seventeen cases of blindness following atoxyl are noted.

Animal trypanosomiasis and piroplasmosis are found in many parts.

A list of the blood-sucking insects of Kamerun and of their habitats is given.

Togo.—In Togo the 633 Europeans suffered from 696 attacks of illness, mostly caused by malaria, but there were only three deaths.

Cases of fever remaining high for several days complicated with albuminuria are frequently observed. One resembling Malta fever was noted. Malaria is almost universal among the native children. Amoebic

dysentery, ankylostomiasis, ascaridiasis, syphilis, and yaws are common diseases of the native population.

South West Africa.—In German South-West Africa, the number of whites has risen from 5,000 in 1902 to 13,962 in 1911, which includes 2,291 troops. There is a native population of 33,344. There were 137 deaths in the Europeans, but many were those of infants, the mortality of whom was 20-25 per cent. Enteric fever and dysentery prevail throughout the Colony. Malaria caused 333 admissions and one death among the Europeans; it is limited almost entirely to the north. Fifteen cases of Malta fever arose among the whites through drinking goat's milk. The natives suffer severely from scurvy, due to the scarcity of vegetables and fresh meat. Tubercle, rheumatic fever and tapeworm are prevalent. One case of bilharzia of local origin has been noted. The water in many parts is brackish, and contains as much as 607 gm. of chlorine per litre; diarrhœa is of frequent occurrence. Influenza was epidemic in the winter.

German New Guinea and South Sea Islands.—There were 20 deaths among the 509 Europeans residing in German New Guinea, but they were mostly due to causes independent of climate. Malaria is prevalent, especially in January at the height of the rainy season; 140 attacks occurred in the whites. A few cases of blackwater fever came under notice. Yaws, ringworm, Tinea imbricata, scabies, pemphigus, eczema, and ulcers which have the local name of "kaskas" are widespread.

The commonest diseases of the West Caroline Islands are tubercle, granular ophthalmia, yaws, tinea, and scabies. In the East Caroline Islands, in addition to these, malaria also prevails.

In July 1910, a fatal epidemic swept through the Marshall Islands, which resembled yellow fever in jaundice and haematuria being frequent symptoms. Fish poisoning is often observed; colic, collapse, anaesthesia of the extremities, followed by ascending paralysis which ends fatally, are the chief features of these cases.

In Samoa, there are 1,473 whites and 35,661 coloured people. There is no malaria, since there are no anophelines on the island. Only three cases of enteric fever are reported. Bacillary dysentery sometimes occurs. Among the native population, filariasis, ankylostomiasis, and leprosy are diseases of common occurrence. The island, however, is very healthy; there were only four deaths among the Europeans during the year.

C. Birt.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 4.

YELLOW FEVER.

JAMES (S. P.). i. **The Protection of India from Yellow Fever.**—*Indian Jl. of Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 213-257. With 3 plans and 1 map. ii. **Note on the Practicability of Stegomyia Reduction in Indian Seaports.**—*Ibid.* pp. 258-262.

i. This report is a result of investigations into the conditions likely to affect the spread of yellow fever from South America to India and other Eastern ports, which might result from the commercial developments following upon the opening of the Panama Canal.

In the first section the distances between the various ports under discussion are considered and a table of distances in nautical miles is added. From this table, in so far as it relates to Indian ports, the author draws the following conclusions :—

"(1) The opening of the Panama Canal is not likely to be followed by direct traffic from Europe through the endemic area to India, for the distance between London and India is, on an average, 10,500 miles longer by the new route than by way of the Suez Canal. This is important because most of India's seaborne trade is with Europe.

"(2) It is not likely to be followed by direct traffic from the United States through the endemic area to India, for New York is, on an average, 6,800 miles, and New Orleans 3,200 miles, nearer to India by way of Suez than by way of Panama.

"(3) It is not likely to be followed by direct traffic from the endemic area *via* Panama to India, for much the shortest routes to that country from the West Indies, Mexico, the Central American Republics, the Panama Canal zone, Colombia, Venezuela, and Guiana will still be by way of Suez, and from Brazil the shortest route is by way of the Cape of Good Hope. Major TUCKER suggests that Jamaica may be a place from which there will be direct traffic to India, but if this were to happen, the route would surely be by way either of the Suez Canal or the Cape of Good Hope ; the distance from Jamaica to Bombay by the Suez route is about 5,100 miles shorter than by way of the Panama Canal. In this connexion it is noteworthy that the Republic of Panama already imports Burmese rice, which goes by way of Liverpool or Hamburg to Colon.

"(4) It is believed that the opening of the canal will result in a great increase of trade in the Pacific coast ports of South America, and it might be conjectured that direct trade between those ports and India will follow For many reasons this is very unlikely to happen ; but even if there were direct trade between, say, Peru or Chile and India, the best route would

(C15.) Wt.P.2413/35—22.12.13. 2000. 2.14. B. & F. G.11/4. A

be from Callao and Valparaiso *via* the Straits of Magellan and the Cape of Good Hope—for the distance from Valparaiso to Bombay by that route is nearly 4,000 miles shorter than by the trans-Pacific route."

It would thus appear that the spread of yellow fever to India, if such happens, will not be the result of direct trans-Pacific shipping to that country from or through the endemic area in Central and Southern America.

The same line of enquiry applied to ports further east than India leads to the result that beyond Singapore the conclusions are, with one important exception, the reverse of those arrived at regarding India; the distances to Japan, China, Australia and the East Indies will, in general, be much shorter by the new route, and for this reason direct traffic to these countries through and from the endemic area may be expected. By the new route Yokohama and Australia will be nearer to New York than to London, but the Panama Canal will not provide a shorter route from Europe to the countries east of Singapore, and this is important as indicating that the through traffic *viâ* the endemic area to the East will not be so great as has sometimes been anticipated. In summing up the enquiry the author says: "the new danger to the East" is a direct danger as far only as Hong Kong, and that the spread of yellow fever to the Straits Settlements and to India by the route which we have been considering cannot result except as a secondary event, subsequent to and consequent upon, the infection of ports in Japan, China, the East Indies, or Australia. The problem of immediate concern, therefore, is the possible spread of yellow fever, not to India, but to the other countries just named.

An account of the steamship companies at present engaged in the trans-Pacific traffic is included, and it is found that most of the traffic to the East starts from ports such as Vancouver and San Francisco, which are not now and are not likely in the future to be infected with yellow fever, but there is also (and has been for some years) a moderate amount of traffic from ports, especially on the Mexican coast, which at least must be regarded with suspicion.

It is by no means sure that the canal will increase the risk of the spread of yellow fever to the extent that has been anticipated, for the situation on the Atlantic side of the canal and in the canal zone itself is now very different from what it was in 1903, when Sir Patrick MANSON first drew attention to the dangers now under consideration. Preventive measures have resulted in the disappearance of the disease from Panama, Colon, Havana and other Cuban ports, New Orleans, Rio de Janeiro, and nearly all the West Indian Islands, and as regards such ports on the Atlantic side of the canal as are likely to be engaged in trans-Pacific trade, not one can be named which is definitely believed to be endemically infected at present. It is further very improbable that the United States will cease to recognise their great responsibility in the maintenance of those measures which have been so successful in ridding the canal of disease; for the extensive use of the canal as a commercial highway would be greatly affected by the failure of these precautions.

On the whole it must be concluded that the present routes are not very favourable to the infection of Asia, and it only remains to endeavour to foretell whether future routes will be more so or not. The following four points are summarised:—

"(1) At present all ships which leave America for the trans-Pacific voyage to the East from San Francisco and more southerly ports use the Hawaiian Islands as the first place of call. The conditions in these islands are throughout the year favourable to the existence of yellow fever, but up to the present the disease has been effectually excluded. The authorities fully appreciate the danger of the introduction of yellow fever from Mexican ports, and very thorough precautions are taken. After studying the local conditions and arrangements in Honolulu I am of opinion that the port affords a strong protection against the infection of Asia and the East Indies.

"(2) On the usual route to Hong Kong the ships, after leaving Honolulu, pass northwards into latitudes not as a rule favourable to the life of mosquitoes, and the remaining ports of call are Yokohama and other Japanese ports and Shanghai. There is a serious gap in our knowledge of the conditions in these ports, for we do not yet know whether *Stegomyia fasciata* occurs in them or not. If it is present, and sufficiently abundant, the introduction of the yellow fever virus might lead to an epidemic, but the climate is such that the disease would entirely die out during the winter, and fresh importation would be necessary for its reappearance.

"(3) The climate of Hong Kong is more favourable to the existence and spread of yellow fever, but again we are ignorant of the presence or absence of *Stegomyia fasciata* there. In all probability a thorough search during the hot months would show that it is present, but quite possibly it is not very abundant.

"(4) The route from San Francisco *via* Honolulu to the Philippines does not necessarily take ships northward to Japan, but until San Francisco or Honolulu become infected such a route is not a cause for anxiety."

Though the foregoing facts must lead to a modification of opinion as to the degree of danger of the spread of yellow fever to the East and to India, the author strongly urges that they do not justify the conclusion that little or no action is at present necessary.

The following recommendations are made:—

1. The appointment of a medical officer in the endemic area who will be able to obtain continuous first-hand information as regards the actual shipping traffic and the measures that are taken to prevent the carrying of infection. A second medical officer might be appointed with Hong Kong as a centre, and it would be a great advantage to have a third with head-quarters at Singapore.

2. The investigation of various subjects which have a direct bearing on the spread of the disease, such as the distribution of *Stegomyia fasciata*, the possibility of *Stegomyia scutellaris* acting as a carrier, and many other matters in connection with etiology and prevention.

3. India should give financial or other support towards the appointment of the intelligence officers, the establishment of a Central Intelligence Bureau, and the institution of any scientific enquiry. Secondly, steps should be taken to reduce the breeding places of Stegomyia in India. And thirdly an enquiry should be made into the possibility of the spread of yellow fever to India by way of the Cape of Good Hope.

4. The line of sanitary defence should be strengthened for our Eastern Colonies and for India, especially in Hong Kong, by the establishment of a modern quarantine station in that port adequate to the needs of a shipping centre of such importance.

Section III of the report (pp. 227-257) contains a general description of the conditions in most of the ports visited.

ii. In the note on the practicability of Stegomyia reduction in Indian seaports it is shown that many of the conditions, social and political, prevailing in India would prevent the adoption of those measures which have been successful in America. In India the problem resolves itself into one of an adequate water supply through pipes, which would render unnecessary the storage of water in cisterns or other receptacles which are the favourite breeding places of this

mosquito. It is suggestsd that the harbour of Madras and the contiguous area of Georgetown would be most suitable for a first experiment.

C. M. Wenyon.

van Loghem (J. J.). **The Yellow Fever Danger for Asia and Australia; especially after the Opening of the Panama Canal.***—*Jl. Trop. Med. & Hyg.* 1913. Sept. 15. Vol. 16. No. 18. pp. 292-293.

This paper shows that the danger referred to is a real one, in that *Stegomyia calopus* can remain infectious very long after having bitten a yellow fever patient; so if the mosquito finds on board ship the means of keeping alive, there is danger of the disease being carried long distances. Repeated experience of the occurrence of yellow fever among the crew and dock labourers during the unloading of ships has proved this. Further, in tropical seas Stegomyia not only remains alive on board ship but sometimes finds an opportunity of breeding. This is more likely to occur in more primitive slow-moving ships than in the faster and better ventilated newer ships. On this account it seems certain that as long as yellow fever occurs in America the chance remains of infected Stegomyiae being transported to Asia and Australia. When once transported the disease would have every chance of maintaining itself, since *Stegomyia calopus* occurs all over the world between about latitude 40° N. and S., and at various places in Asia and Australia these mosquitoes occur in such numbers and under such circumstances that yellow fever would be able to hold its own and be propagated further.

As regards precautionary measures to be taken in Asia and Australia, the author concludes that as Stegomyiae may be hidden in cargo and not discovered by inspection; as cases of the disease may escape clinical recognition; and as there is no means of identifying those healthy people who are in the incubation period of the disease, it will be necessary to fumigate every ship which has touched at an infected or suspected port in the Stegomyia zone, to keep in quarantine and observe for a few days the whole crew, and to remove all fever patients in mosquito-nets and isolate them in a mosquito-proof hospital. At the same time, the campaign against Stegomyia in Asian and Australian ports ought to be started with all energy.

C. M. W.

Flourens. **Note sur la dernière Epidémie de Fièvre Jaune au Sénégal.**—*Rev. de Méd. et Hyg. Trop.* 1913. Vol. 10. No. 1. pp. 31-34.

Several cases of yellow fever followed by death having been recorded in Senegal between October 1911 and March 1912, the author of the present note was recalled from the Soudan to administer the sanitary service in Baol and western Sine-Saloum. As no cases occurred for some months it was thought that no further danger existed, but the disease suddenly declared itself at Kehemer, and on September 30th

* Summary of communication presented at the XVIIth International Congress of Medicine, London, August 1913.

two deaths attributed to this disease occurred at Tivaouane. On October 7th news was received that Louga and Sakal were infected places and on October 12th a case occurred in Diourbel and two in Dakar, all of which terminated fatally. On October 17th the author himself became ill with the disease in Diourbel, and three other cases occurred in the period ending November 13th. Meanwhile the epidemic passed along the railway running from Thies to Kayes, with fatal cases amongst the railway employees at Kapine and Birkelane. Probably other cases unidentified occurred along this line.

The epidemic of 1911 commenced in the Gambia, passed along the line through Dakar, Thies, N'Dande, and ended with the last case at Tivaouane, on March 15th, 1912. The 1912 epidemic commenced, as already stated, at Kehemer, not very far from Tivaouane, and spread along the Dakar-Saint Louis line through Longa and Sakal, up to the end of September. At this time the infection was carried across from this line to Diourbel on the Thies-Kayes railway. The author can only explain this spread of the epidemic by assuming that the disease can be preserved in a latent or ambulatory form in the natives of the country.

C. M. W.

i. Hopkins (F. G.). **Report on Cases of Yellow Fever occurring in Accra in March 1913.** (Received in Colonial Office. July 7, 1913.)
ii. Muller. **Report on a Case of Yellow Fever in Abokobi.**—(Received in Colonial Office June 30, 1913.)

i. The report contains an account of seven cases of fever—five in natives and two in English residents—which were carefully examined for malaria and other parasites without any cause for the fever being discovered. All seven cases were diagnosed as yellow fever, and the report contains details of the course of the disease and treatment of the several cases, all of which recovered.

The principal features of the native cases, all of which were of a mild type, were fever, 103°–104° F., gradually falling to normal during the course of ten days or a fortnight, a varying degree of albuminuria, jaundice as indicated by colouring of the conjunctivae, and a certain amount of tenderness over the liver, which was enlarged in two cases. Examination of the blood for malarial parasites and pigmented leucocytes was negative in each case, nor could any cause for the illness be discovered in the faeces. Most cases showed at some time or other a decrease in the polynuclear and an increase in the mononuclear cells of the blood. All the cases, including the two Europeans, commenced their illness during the course of three weeks, so that the outbreak can be regarded as a mild epidemic of yellow fever.

ii. An account of a typical and fatal case of yellow fever occurring in a European—a missionary of the Basel Mission Station of Abokobi, Gold Coast.

C. M. W.

Johnston (J. E. L.). **The Pathology of Yellow Fever.** [Correspondence.] —*Lancet*. 1913. Dec. 6. pp. 1660-1661.

The writer draws attention to investigations undertaken by him in

conjunction with Scott MACFIE on an outbreak of yellow fever which occurred in Lagos, in May 1913. The chief point is the finding in the red cells of "parasitic bodies which proved to be identical with the *Paraplasma flavigenum* described by SEIDELIN." These were fairly numerous in the blood, were present in every definite case, and should be of use, he writes, in diagnosis. They were present for several days, sometimes as late as the twelfth day, and were inoculable into guinea-pigs even as late as the eighth day. Guinea-pigs were most successfully infected, dogs and white rats were found susceptible. Guinea-pigs were also infected by sub-inoculation. Several stray dogs were found to harbour "very similar bodies—a point that may prove of importance in the spread of the disease."

C. M. W.

MACDONALD (Angus). **Is Yellow Fever endemic in Jamaica?**—*A paper read before the Jamaica Branch of the British Medical Association, Dec.* 1912. 17 pp. 1913. Jamaica: Egbert S. Baird, Printer & Publisher.

The present paper deals with a report made by Captain POTTER on the nature of the so-called vomiting sickness of Jamaica, which he considers to be no clinical entity, but simply yellow fever which must be regarded as endemic in the island. The author enters into a detailed discussion of Captain POTTER'S report, and comes to the conclusion that he has failed to establish his claim that yellow fever is endemic in Jamaica; for of 38 cases which were considered as possibly yellow fever not one showed the typical clinical picture or post mortem findings of this disease. The author believes that the term vomiting sickness includes several diseases, one of which is cerebrospinal meningitis. It is claimed that POTTER has not excluded these cases nor has he made any attempt to fit in the distribution of his supposed cases of yellow fever with that of the *Stegomyia fasciata*. Accordingly, in Macdonald's opinion, it still remains to be proved that yellow fever is endemic in Jamaica.

C. M. W.

SEIDELIN (Harald). **On "Vomiting Sickness" in Jamaica.**—*Ann. Trop. Med. & Parasit.* 1913. Nov. 7. Vol. 7. No. 3B. pp. 377-478. With 5 plates.

Vomiting Sickness is prevalent in Jamaica during the winter months, and is responsible for a considerable mortality, chiefly amongst native children. The subject has already been investigated by POTTER and SCOTT [see this *Bulletin*, Vol. 2, pp. 104–105.] Seidelin took up his stay at Kingston and investigated the subject from there. He saw, in all, 62 cases during his ten weeks' stay in Jamaica. The conditions of work made it impossible to investigate all epidemiological, clinical, anatomical, and microbiological details in each case as fully as might have been desirable. Further, as the author had to proceed to Africa the histological examinations of the various sections were not carried out in every detail.

Since 1905, when KER drew attention to the prevalence of vomiting

sickness in Jamaica, great uncertainty has prevailed as to its nature. (1) The disease appears at a certain fixed time of the year, November to March, a time when the temperature varies greatly from day to night; (2) It rarely appears in towns, none of the cases reported coming from such situations; (3) The people attacked are chiefly, but not always, children; (4) It appears so suddenly and runs its course so quickly that medical men never hear of two thirds of the cases until after death has occurred; (5) Frequently several members of a family are attacked.

POTTER believed that the majority of the fatal cases were yellow fever. SCOTT, on the other hand, that some, at any rate, were epidemic cerebrospinal meningitis. The author saw no cases of cerebrospinal meningitis of an ordinary type, but states that the *Diplococcus meningitidis* does occur in Jamaica, and quotes two cases seen in adults at the time that vomiting sickness was prevalent.

Five of Seidelin's cases were regarded as suspicious of yellow fever; notes of all these are given. In one case there was little doubt that this was the correct diagnosis, and the post mortem findings were typical.

In four other cases also the pathological lesions pointed to yellow fever, but the clinical and epidemiological characters made the author hesitate in pronouncing them so. In other cases malarial parasites were found, and were evidently the cause of the symptoms. As regards the pathological anatomy of the condition the most striking anatomical lesions are:—enlargement and hyperaemia of the lymphatic nodules; petechiae on the surface of the heart and in the gastric mucosa; necrobiosis of the pancreas, liver and kidneys, especially of the pancreas, and fatty change of these and other parenchymatous organs. There was often a marked hyperaemia of the spinal and cerebral pia, though in other cases this was very moderate, and in others limited to the cerebral pia. The intensity of the lesions differed very much, especially that of the fatty changes, which were most marked in the cases of one or two days' duration.

The pathological histology, the author believes, explains the most striking features of the disease, namely, the rapid course, the high mortality, and the haemorrhagic degeneration and necrobiotic phenomena just described.

The nature of vomiting sickness is very uncertain, but Seidelin believes that until further evidence is brought forward we must assume that there is such a disease and that it is a local one of Jamaica. The epidemiological evidence is rather against identifying it with yellow fever, and the classical clinical symptoms of that disease, such as fever, black vomit, jaundice and anuria, are almost constantly absent. These may, of course, be absent in cases of real yellow fever, but it is hardly conceivable that they should all be absent in practically all cases in large outbreaks. The most striking feature of all would be that these abnormal epidemiological, clinical and pathological characters, if the disease really were yellow fever, should have repeated themselves year after year in an absolutely typical manner. This certainly is a very strong argument that we have to do with a specific and typical disease.

As regards cerebrospinal meningitis, Seidelin states that SCOTT in his latest paper is less positive with regard to the essential importance

of his results, as far as vomiting sickness is concerned, than he was to begin with. The author does not discuss the results published by SCOTT, but limits himself to his own investigations, in which he was greatly assisted by that observer. His conclusions briefly are that at the present state of investigations the explanation which at first sight seems the most probable, viz., that vomiting sickness is simply a form of meningitis, cannot be accepted, and he believes that further investigations are therefore absolutely imperative.

It is possible that the cause may be a blood inhabiting, presumably protozoal organism, and that a diplococcus infection of the meninges occurs as a frequent complication, as a rule not giving rise to any marked anatomical lesions because of the rapidly-following death, but in a few cases producing a typical fibrino-purulent meningitis. Another possibility is that the causal organism may be parasitic in the intestine and produce exceedingly active toxins. Other theories, such as vomiting sickness being identical with malaria, with some form of helminthiasis, or with some kind of poisoning, find no support whatever from his observations.

[Seidelin's researches therefore do not advance the subject very much, and leave it in the uncertain position in which it was before. Possibly the disease is a specific one, due to some hitherto unrecognised organism.]

G. C. Low.

LEPROSY.

TRANSMISSION.

PALDROCK (A.). **Wanzen und Schaben als Verbreiter des Lepraerregers.** [Bugs and Cockroaches as Propagators of Leprosy.]—*Dermatol. Centralbl.* 1913. Dec. Vol. 7. No. 3. pp. 66-71.

In the year 1907 BASSEWITZ reported a case of leprosy which he believed was caused by the *Acarus scabiei*. Two years later EHLERS investigated the intestinal contents of bugs, lice, fleas, and mosquitoes, which had bitten lepers. The *B. leprae* was found for only a short time after feeding. SANDES observed acid-fast rods in *Acanthia* [*Cimex*] *lectularia* 16 days after sucking the blood of a leper, and quoted the case of a boy who developed leprosy after being bitten by bugs, when visiting his infected father in a leper home. LONG recorded an instance of a man, who resided in a leprosy-free village in Basutoland, spending a night in a hut which had been inhabited by a leper. He was bitten by bugs, and became a leper.

In the author's investigations Baumgarten's and Unna's methods of staining were used. In the former, decolorization of the fuchsine stained films is effected by the application of nitric acid alcohol, 1 in 11, for half a minute. In the latter, the thymen-victoria-blue stained specimens are treated with 30 per cent. nitric acid for 5 seconds, with alcohol, safranine, and a second application of the acid for 5 seconds successively. UNNA states that living *B. leprae* are stained blue and dead yellow or rose.

Twelve hours after feeding *Cimex lectularius* on the excised nodules of lepers, bacillary forms of the *B. leprae* are seen no longer; the rods already are broken down into granules which disappear in a fortnight. In bugs fed directly on lepers, no trace of the *B. leprae* is present after the first 24 hours.

When the cockroaches, *Blatta germanica* and *Periplaneta orientalis*, are fed on lepromata, *B. leprae*, staining blue by Unna, and hence presumably living, are found in the intestinal contents for 14 days, together with rods which have degenerated. No acid-fast bacilli were found in control insects.

Other observers have not been successful in detecting *B. leprae* in bugs which have sucked leprous blood [see this *Bulletin*, Vol. 2, p. 502.]

C. Birt.

SMITH (Allen J.), LYNCH (Kenneth M.) & RIVAS (Damaso). **The Transmissibility of the Lepra Bacillus by the Bed-bug.** (*Cimex lectularius* L.)—*Amer. Jl. of the Med. Sciences.* 1913. Nov. Vol. 146. No. 5. pp. 671-681.

Preliminary experiments with flies were made by placing them in vessels containing sugar, blood, etc., contaminated with Duval's acid-fast bacillus. These rods were recovered from the proboscis and legs, but not from the interior of the insect. At first it was found to be impossible to induce bugs to feed on blood, but this difficulty was overcome by stretching rat skin over the infected blood. According to NUTTALL, if the antennae of the bugs are destroyed, this artifice is

not required.* Over a hundred bugs were infected with Duval's bacillus after ingesting contaminated blood; a general infection is caused, but the bacilli disappear in two to four weeks. No acid-fast rods were discovered in control bugs. Acid-fast bacilli were found in bugs which had fed on two lepers, from whom the authors state they isolated *B. leprae* by culture of the blood, but no more particulars are given. Bugs infected with Duval's bacillus did not transmit this microbe to frogs or fish. Smears made of the crushed skin of a guinea-pig, at the site of puncture by bugs infected with Duval's bacillus, contained acid-fast rods.

[Throughout this paper it is assumed that Duval's acid-fast bacillus is identical with *B. leprae*, but DUVAL himself has admitted that he was mistaken in this belief. (See this *Bulletin*, Vol. 2, p. 504.)]

C. B.

McCOY (George W.) & GOODHUE (William J.). **The Danger of Association with Lepers at the Molokai Settlement.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 7-10.

Of 119 healthy men and 106 women, Hawaiians or of mixed descent, living in the same house as lepers, 4·2 per cent. of the former and 4·7 per cent. of the latter contracted leprosy. Twelve Caucasian women who came into contact with lepers remained free from infection, but three of 23 Caucasian men developed leprosy after three, nine, and seventeen years of residence; Father DAMIEN was one of these. The incidence of leprosy among the healthy residents of the settlement, was greater in times past; in the year 1886, 17 out of 178, and in 1888, 23 of 66 contracted the disease.

The risks of the most intimate association are not so great as might be imagined, for 93 out of 98 healthy men who married 133 leprous women escaped infection, as did 79 of 83 healthy women who married 116 leprous men.

C. B.

BAYON (H.). **An Address on the Clinical and Bacteriological Aspects of Leprosy. Delivered at the Royal Society of Medicine.**—*Brit. Med. Jl.* 1913. Nov. 29. pp. 1420-1423. **The Leprosy Problem in the British Empire.**—*Lancet.* 1913. Nov. 29. pp. 1527-1530.

Leprosy is slightly contagious only for, on combining SAND's and LIES's Norwegian statistics, we find of 2,010 children born to 587 married couples in which the father alone was leprous 7 per cent. developed leprosy. 14 per cent. of 1,181 children of 361 couples in which the mother was infected, were attacked. 26 per cent. of 142 children of 45 couples in which both parents were lepers, became

* HINDLE & MERRIMAN. **The Sensory Perceptions of *Argas Persicus* (Oken).**—*Parasitology.* 1912-13. Vol. 5. No. 3. p. 216. The authors write:—"Haller's organ [on the first pair of legs] is olfactory in function and constitutes a means by which a tick is able to recognise its host. By depriving ticks of this organ it is possible by suitable means to cause them to feed on media other than blood, thus showing that a sense of taste is absent. *Argas persicus, Ornithodorus moubata* and *Hyalomma aegyptium* have all given similar results with regard to the latter point and we believe that this constitutes a method by which perhaps other blood sucking arthropods, after being deprived of the organ or organs necessary for the recognition of their hosts, may be made to feed on any desired medium."

leprous. According to KITASATO, 7 per cent. of the offspring fo Japanese lepers contract the disease. Husband and wife infection occurs in 3·8 per cent; brother and sister in 4 per cent.; and 2·7 per cent. of people in the same residence fall victims to leprosy. The author thinks that this low infectivity of the *B. leprae* goes far to explain the lack of success in cultural and animal experiments. Contagion cannot be ignored, for in North Germany the infection has spread concentrically from cases imported from Russia. Out of the 25 or 50 lepers now living in the United Kingdom, one has acquired the disease locally. Sir George TURNER contracted the ailment while he was Superintendent of the Pretoria Leper Asylum. Moreover the children of leprous parents rarely develop leprosy if they are taken away from them. Segregation of the lepers in the Philippines has reduced the admission rate by 90 per cent.

Chaulmoogra oil and its derivative, antileprol, in 3–5 cc. doses, given intramuscularly every three days for five months or more, are the best remedies for advanced nodular cases. Two cases of macular leprosy are cited, in which great improvement was observed after inoculation with an extract of Kedrowsky's bacillus. Spontaneous recoveries, or remissions lasting many years, may occur.

C. B.

BACTERIOLOGY.

HOLLMANN (Harry T.). **The Presence of Acid-fast Bacilli in Secretions and Excretions of Lepers.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 15-22.

Seventy-five lepers were examined, 58 of whom were suffering from the nodular type, six from the mixed, and 11 from the anaesthetic type of the disease.

In the year 1891 GOLDSCHMIDT discovered acid-fast rods in the nasal secretion of lepers, an observation which has been confirmed by many workers. Hollmann detected acid-fast bacilli in the nasal mucus of 89·6 per cent. of the 58 nodular cases, in 66·6 per cent of the six mixed, and in 45·4 per cent. of the anaesthetic cases. Altogether 329 examinations were made, and in a note he says that bacilli were present, at some time, in all anaesthetic and mixed cases, and in all but three of the nodular cases.

Since BABES and KALINDERO found *B. leprae* in the saliva of lepers in the year 1888, not very much work has been done on the subject. The saliva of 53 lepers was examined 317 times; acid-fast bacilli were demonstrated in 13 of the specimens which were obtained from 10 nodular cases with lesions in the mouth, that is in 21·7 per cent.

Acid-fast rods were detected seven times in the sputum of four of 31 lepers suffering from cough, but in three of the cases the sputum inoculated into guinea-pigs set up tuberculosis.

The urine of 48 lepers was examined 377 times, acid-fast bacilli were found on 15 occasions in the urine of eight nodular cases, or in 7·1 per cent. of nodular lepers.

The faeces of four nodular cases were examined 671 times with negative result.

Two hundred and fourteen samples of sweat were obtained from 48 lepers; acid-fast rods were demonstrated eight times from six nodular cases, or in 14·2 per cent. of patients suffering from this type of leprosy.

Acid-fast bacilli were found in the tears of two lepers with lesions of the sclerotic, or in 14·2 per cent. of nodular cases. Altogether 205 specimens of the lachrymal secretion of 41 lepers were stained.

A bibliography of 34 references enhances the value of this excellent paper.

C. B.

LEBOEUF (A.) & JAVELLY (E.). **Sur la Présence de Bacilles de Hansen dans les Ganglions superficiels de Sujets sains en apparence.**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 607-608.

After referring to their own and SOREL's positive results, which have been published already, [see this *Bulletin*, Vol. 1, pp. 191 and 559] the authors announce that they have discovered the *B. leprae* in the inguinal glands of a healthy girl, the sister of a leper. The examination of the glands of nine other near relatives of lepers was negative. They think that the *B. leprae* invades the body through the skin.

C. B.

FAMBRI (Elena). **Osservazioni Anatomo-Patologiche Intorno ad un Caso di Lepra universalis.**—*Pathologica.* 1914. Jan. 1. Vol. 6. No. 124. pp. 10-14.

The case under discussion was that of a girl, aged 14, admitted to the Venice Civil Hospital, where she died in December 1912. The disease had been of the nodular variety, and was contracted in Brazil. The autopsy, which is very fully reported, brought to light a widely generalised infection with lesions in the lungs, spleen, liver, genital organs, and intestine. In addition to typical lepra cells and acid-fast rods, there were noted giant cells and caseous material, the giant cells having peripherally arranged nuclei. The bacteriological investigation consisted in attempting culture on media of a kind calculated to give a growth if inseminated with the tubercle bacillus, and the inoculation of laboratory animals with material obtained from the spleen, lungs, bone-marrow, contents of the infected Fallopian tubes, cerebro-spinal fluid, and the blood from the ascending cava. The cultures were negative on all the media used. Of the inoculated animals (rabbits, guinea-pigs and white rats), those treated with material from the lungs, cerebro-spinal fluid, and blood from the ascending cava, all survived. Inoculations with splenic material led to infection of both rabbits and guinea-pigs, the animals showing glandular infiltration, pulmonary nodes, and enlarged spleen. From the bone-marrow guinea-pigs only were infected. Especially remarkable were the results in a guinea-pig inoculated with the caseous contents of one of the Fallopian tubes, the inoculation being given subcutaneously in the interscapular region. At the site of injection a swelling the size of a pigeon's egg was formed, containing creamy pus, and rich in leprous cells. Around the resulting ulcer the tissues showed a tendency to spontaneous cicatrisation. On the animal being killed after three months, the lungs, spleen and liver were found greatly increased in size, dotted with yellow nodes, some isolated, others confluent, and the lymphatic glands were enlarged and caseous. Acid-fast bacilli were demonstrated in the scar tissue at the site of

inoculation, in the liver, spleen, lungs, in the glands, and in the left suprarenal capsule.

The conclusion of the author is that, in the uncertain state of our knowledge as to any final and conclusive test for the differentiation of the bacillus of KOCH from that of HANSEN, the mere fact of infection of guinea-pigs is not sufficient to prove the presence of tubercle bacilli. Having regard to the undoubted leprous nature of the original infection, and to the fact that material from the lungs led to no symptoms in experimental animals, there is much evidence to support the conclusion that the generalized infection in the lungs was pure leprosy. The lesion in the Fallopian tubes was probably a mixed infection, in which both tubercle and leprosy participated, while the results of the investigation do not justify any absolute conclusion as to whether the lesions in the spleen and bone-marrow were mixed infections or not.

[The presence of giant cells and caseous material in the original case, and the findings in the animals inoculated, make it clear that the infection was one of mixed tubercle and leprosy. This once admitted, one sees no reason for discussing whether any given organ presented a pure or mixed infection, while the suggestion that the results point to the infection of guinea-pigs with lepra bacilli is hardly justifiable].

S. L. Cummins.

CLINICAL.

McCOY (George W.). **Glandular Tuberculosis among Lepers at the Molokai Settlement.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 3-6.

In a period of nine months ten cases of tubercular glands were observed among 650 lepers; the axillary glands were affected in seven, the inguinal and femoral in three, the cervical and supratrochlear in one each. In nine of the patients there was no evidence of tubercle in other parts of the body. All were adults. NOW PARK and KRUMWIEDE in their study of glandular tuberculosis* found that 25 only, out of a total of 119 of those attacked, were 16 years of age or over; moreover in no more than eight of the 119 were the axillary and inguinal glands infected. In the glands of two lepers suffering from the anaesthetic form, the acid-fast bacilli were few; but in the other eight in which the disease was of the nodular or mixed type, acid-fast bacilli were numerous; hence it is probable that the glands contained both *B. leprae* and *B. tuberculosis.* Cultures of the tubercle bacillus were obtained directly from the glands of two by culture on egg media, and in the rest by passage through guinea-pigs. The growths showed little virulence to rabbits when 1-20th of a loop of a 22-day culture was inoculated intravenously; also the proliferation was rapid on glycerine egg; hence the strains isolated were of the human type of *B. tuberculosis.*

C. B.

CLEGG (Moses T.). **Absence of Luetin Reaction on Lepers showing a Positive Wassermann Reaction.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. .pp. 11-14.

Luetin is the name given by NOGUCHI to dead cultures of the *Tre-*

* *Jl. of Medical Research*, Vol. 13, p. 363.

ponema pallidum grown by him. When this substance is injected intradermically, an inflammatory area appears at the site of inoculation in most cases of tertiary, hereditary and latent syphilis.

Since the year 1908, it has been shown by many investigators that the serum of lepers is often positive to the Wassermann test, although there may be neither history nor signs of syphilis. Clegg found that 11 of 24 lepers responded to the Wassermann test; although reliable histories could not be obtained, there were no other indications of specific disease in these 11 patients. The luetin reaction was negative in all.

C. B.

McCoy (George W.). **Fecundity of Hawaiian Lepers.**—*Treasury Dept. U.S. Public Health Bull.* No. 61. 1913. July. pp. 23-25.

The general birth-rate of the total population of 191,909 was 26·82 per thousand in 1910, but this may be an underestimate, since the registration of births is sometimes neglected; the birth-rate of the leper settlement was 28·1 per thousand for that year. Since 1900 the average birth-rate in the leper population of an annual average of 850 has been 19·26 per thousand; when both parents were lepers, average annual number in this group 748, the birth-rate was 17·38; when the mother was leprous and the father healthy, number 55, it was 47·48; when the father was a leper and the mother healthy, number 48, it was 16·02 per thousand per annum.

The author concludes:—

(1) The birth-rate of the Molokai Settlement is probably about two-thirds as high as that of the non-leprous members of the same race outside, but the data for an entirely just comparison are lacking.

(2) The birth-rate among lepers appears to depend on the fertility of the male, which probably is materially reduced.

(3) The fertility of the female does not appear to be impaired.

C. B.

Treatment.

de Verteuil (F. A.). **Report by the Medical Superintendent of the Leper Asylum, Trinidad.**—Report dated Sept. 18, 1913. Received in Colonial Office, Oct. 29, 1913.

Nastin, chaulmoogra oil and antileprol were used in the treatment of three cases of nodular leprosy, which lost all signs of the disease; salvarsan also was given to two of them. In two anaesthetic lepers, an arrest of the disease occurred after 38 and 67 injections of nastin. The remedies must be continued for two or more years. Nastin is contra-indicated in ulcerating leprosy.

C. B.

Scott (L. Bodley). **The Nastin Treatment of Leprosy.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 352-383.

This paper, in which the author analyses the results in 49 cases observed in the Sylhet Asylum, Assam, is important, as there are not

many published accounts of the effect of Nastin in comparatively large groups of cases, and continued for considerable periods.

Methods of treatment.—Only Nastin B1 was used, a full tube being injected at each dose. The injections were given intramuscularly in the interscapular region, the skin being sterilized with iodine. The intervals between injections varied, but the author is inclined to think that the irregular fortnightly dose [*sic*] gives the best results. DEYCKE's latest plan of intermittent treatment was not systematically tried.

The results are shown in the following table.

Length of time under treatment.	"Cured."	Greatly improved.	Considerably improved	Somewhat improved.	Stationary.	Worse.	
3 years and over ..	1	—	—	—	—	—	
2½ years and over ..	—	1	—	—	—	—	
2 years and over ..	—	2	—	—	—	1	
1½ years and over ..	1	1	1	—	—	—	*Intercurrent dysentery. Leprous symptoms had improved.
1 year and over ..	4	3	3	5	1	2*	
9 months and over..	—	4	4	3	—	1	
6 months and over..	1	1	2	1	—	—	
Under 6 months ..	1	—	2	1	1	1	
Total ..	8	12	12	10	2	5	=49

"Cured" means complete restoration to health, strength, and working power, with loss of every symptom which causes inconvenience or incapacity. It does not mean in every case complete disappearance of every sign of leprosy.

[In assessing the results of the above table, it should be remembered that, in all attempts to treat very chronic conditions by vaccines, it is necessary to persist in the treatment for a considerable time. It will be noticed that in the 24 cases treated for a year and over the "cures" and those "greatly improved" amount to 13 out of 24, or more than half, while in 23 cases under treatment for less than a year, these groups amount to 7, or less than one-third. It would be natural to expect the reverse if the alleged improvement were due to suggestion only, or to a temporary benefit from asylum conditions.]

The results of the treatment on the principal symptoms are tabulated separately, and are of much less importance than the general results, since the tendency of the disease to improve in one manifestation while progressing in other respects must necessarily vitiate observations founded on separate symptoms. The relief of pain and the return of sexual power under the treatment are points of great interest, especially the latter, as there is reason to think that loss of sexual power is progressively increased during the course of untreated leprosy. In summing up his results, the author asks: "Are the

results of the Sylhet cases such as might be expected in the natural course of leprosy treated by any other method or not at all?" Putting aside the question of cure [a word which the author uses rather injudiciously, in spite of the fact that he adds a definition which modifies the expression] the improvement noted in 85 per cent. of the cases constitutes, in his opinion, sufficient ground for a very favourable conclusion. "The good effects are not rapidly striking. They are slowly and gradually developed, and are often not easily observed. They are nevertheless found to be substantial when treatment is sufficiently prolonged, and a careful estimate made of its results." The results of Nastin treatment, as published by other workers, are summed up under the headings of "favourable" and "unfavourable." The author then draws a comparison between his own results and those reported in a much larger series of cases by K. S. Wise, from the Mahaica Leper Asylum, of British Guiana. [(Report to Government of British Guiana, March 1911) See also this *Bulletin*, Vol. 1, p. 197], and notes the very different conclusions drawn as to the value of Nastin. He remarks on the curious fact that in the published reports "almost all the experiments in India, Persia, and Turkey have given good results, the European reports vary, the Far Eastern and Australian reports are all unfavourable, and the great majority of the experiments amongst the African races have been failures, including those of British Guiana." As a possible explanation of these differences the author suggests that the virus of leprosy may vary in different places in a manner corresponding, perhaps, to the three racial divisions of the Old World, Aryan in West and Southern Asia and in Europe, Mongolian in North and Eastern Asia, and Negroid in Africa. [This interesting suggestion would be more easily defended on a geographical than a strictly racial basis, since the movements of mankind in very early times are much too uncertain, and the anthropometric and philological observations much too inconclusive to justify the placing of the various leprous communities under the headings suggested by the author.]

S. L. C.

Heiser (Victor G.). **Leprosy. Treatment of Two Cases with apparent Cure.**—*U.S. Public Health. Rep.* 1914. Jan. 2. Vol. 29. No. 1. pp. 21-22.

Dr. Heiser has already reported two cases [this *Bulletin*, Vol. 2, p. 513], treated with apparent success by means of hypodermic injections of chaulmoogra oil and resorcin combined with vaccine therapy. In the two cases now recorded no vaccine treatment had been given, so that the results, if attributable to treatment, are due to the injections of chaulmoogra oil and resorcin only. The cases were very mild. In the first case, a female aged 11 years, suffering from macular leprosy microscopically confirmed, the injections were given at weekly intervals in doses rising from 1 cc. to 12 cc., and then gradually diminishing to the original dose, this diminution being succeeded by another rise to the maximum. The course lasted eight months. Following the inoculations, the macules ulcerated, and the ulcers then gradually healed. Microscopical examination of the originally infected sites was negative, nor was there any clinical evidence of leprosy after the

treatment. In the second patient, a Filipino male aged 40, the leprosy was of the macular type, and the diagnosis was confirmed microscopically. Treatment by chaulmoogra oil injections was continued for less than four months, the doses rising from 1 cc. to 5 cc., given into the buttock at weekly intervals. Larger doses could not be tolerated, as they were followed by palpitations and precordial distress. The patches healed, apparently without ulceration, and microscopic examination was negative six months after the inception of treatment, when the patient was discharged from hospital. [The subsequent history of these cases will be awaited with interest.]

S. L. C.

TURKHUD. **Treatment of Leprosy with Captain Williams's Vaccine.**—*Report of the Bombay Bacteriological Laboratory for the year* 1912. pp. 26-29. (1913. Bombay: Government Central Press.)

Of 59 cases of leprosy, in various parts of the world, treated with a vaccine prepared from a streptothrix isolated from a leper by WILLIAMS, improvement is reported in 21. The records vary with the observers; thus WATKINS-PITCHFORD noted no beneficial effect in 10 lepers at the Pretoria Asylum. Turkhud himself states that improvement in some cases, in his experience, is very definite, though gradual. The injections must be repeated every ten days for months; sometimes a severe reaction results.

C. B.

JANIN (Francisque). **Essai de Sérothérapie de la Lèpre.**—*Rev. de Méd. et d'Hyg. Trop.* 1913. Vol. 10. No. 2. pp. 81-89.

CARASQUILLA, and after him LAVERDE, endeavoured to prepare an antileprous serum by immunizing animals with the blood, serum, and fluid expressed from lepromata. METCHNIKOFF, however, showed that such a serum was cytotoxic rather than antitoxic or bactericidal; and that analogous effects are produced by the serum of a goat inoculated with normal human blood. The author applied blistering fluid or plaster to portions of the skin of lepers in which the nodules were numerous, and injected eight to ten cc. of the serum resulting into the same or other patients. His first case was one of nodular leprosy of five years' standing; after six injections of the patient's own serum, given at intervals of ten days, the lepromata disappeared, and the skin regained its normal suppleness. A second leper, who had been suffering from the anaesthetic form of the disease for four years, was benefited by three injections of the serum of the first case. A subject of macular leprosy, who was in feeble health, improved considerably after six doses of his own blister serum. Another similar case received four injections, after which the eruption grew paler, and sensibility was restored in the more recent patches. Four injections of this man's serum were given to a girl, who had been an anaesthetic leper for four years. No change was noted in the lesions, but her health improved rapidly. Four doses of the same serum were administered to a man broken down by anaesthetic leprosy of ten years duration, who had perforating ulcer of his foot; this healed and he became stronger, but the leprous areas of the skin remained unaltered. Hence the author concludes that the blister exudate of lepers exerts a specific

effect; a sharp febrile reaction sometimes occurs after the first injection. He thinks that injections of normal horse or ox serum, local treatment by hot baths, lotions, massage, and Bier's method are useful auxiliaries. He has employed this leper blister serum, which has been filtered or centrifuged, as a prophylactic remedy in doses of 2 to 8 cc. It excites a mild reaction only in healthy people.

C. B.

UNNA, jun. (P.). **Ueber Diathermiebehandlung bei Lepra.** [The Diathermic Treatment of Leprosy.]—*Berlin. Klin. Wochenschr.* 1913. Nov. 17. Vol. 50. No. 46. pp. 2138-2140.

No lasting beneficial effects have been obtained in the treatment of leprosy by means of X-rays, Finsen-light, or ultra-violet rays; transitory improvement may occur, but this is often not so marked as that after the application of cheaper chemical and surgical procedures. Diathermy gives better results. [The term diathermy is given to the therapeutic heating effects of high frequency currents. If the oscillations are sufficiently frequent, the current passes through the human body without the manifestation of the ionic phenomena, shock, muscular contractions, and painful sensations; but heat is generated to a considerable depth. If one electrode be large, and the other small, the temperature of the latter is the greater, and if its size be still further diminished, it becomes a cautery. De FOREST'S needle is such an electrode.] Unna in the last three years has used diathermy in the treatment of seven cases of nerve leprosy, applying 0·5 to 0·7 milliampere of current for five minutes on six to 42 occasions. In most of these cases the infiltration of the nerves was lessened, the neuralgia alleviated, and the paraesthesia diminished. Anaesthesia remained unchanged except in one, in which it became less. Not only were the pains relieved almost immediately, but pressure on the nerves could be borne in patients in which the neuralgia had resisted all other treatment.

The high frequency current was applied with de Forest's needle to the nodular lesions of two lepers. In one the needle was introduced into all the nodules under anaesthesia; the lepromata were destroyed, but the ulcers which resulted were slow in healing. In the other, infiltrations of the penis, glands and leg were treated in like manner under cocaine, with benefit. This method of cauterization is preferable to, and less painful than, excision or Paquelin's cautery. The author concludes:—

Diathermic treatment causes the relief of pain in leprosy; no other remedy approaches it in its analgesic effects, and in alleviating neuralgic attacks. Under it, deep-seated infiltrations disappear in a comparatively short time. The destruction of lepromata with de Forest's needle is a better method of removal than the actual cautery or excision.

C. B.

de VERTEUIL (F. L.). **The Action of Radium on the Lepra Bacillus.**—*Arch. of the Röntgen Ray.*—1913. July. Vol. 18. No. 2. (No. 156). p. 53.

It was shown by Helen CHAMBERS and RUSS that the alpha and beta rays from small quantities of radium are bactericidal in vitro. The author irradiated the nodules of a leper with soft beta rays

obtained by the application of a radium varnish apparatus containing 80 mgm. of radium bromide of 500,000 activity, enclosed in rubber-cloth, for one hour. The lepromata became smaller, and after the 13th day granular degeneration of the *B. leprae* was noted, which progressed until all the rods were reduced to small granules in the third week. He suggests the use of radium emanation by inhalation, or in solution for the treatment of leprosy.

C. B.

Prevention.

White (Charles J.). **What shall we do with our Lepers?** [Editorial].—*Jl. Cutaneous Diseases, incl. Syphilis.* 1913. Nov. Vol. 31. No. 11. (Whole No. 374), pp. 790-801.

There are few lepers in the United States, except in Louisiana, California and Minnesota. Different States adopt different laws. In New York the leper is placed under no control; in Massachusetts and Louisiana he is isolated in a leper hospital. In many parts when a leper is discovered, he is shunned or expelled by the inhabitants. It is suggested that a national leper ayslum should be established in some island off the American coast.

C. B.

Historical and General.

McCoy (George W.). **A Brief History of Leprosy in Hawaii.**—*Military Surgeon.* 1913. Dec. Vol. 33. No. 6. pp. 522-527.

The disease was first recognized in the person of a Captain of the Palace Guard in 1840. It was probably introduced by the Chinese. By 1863 the disease was evidently very prevalent, as 50 cases were recognized by a physician in the island of Lahaina, ten more having died in the preceding year. The first law of segregation was passed in 1865, the duty of isolating lepers being vested in the Board of Health. A settlement for lepers was instituted on a peninsula looking northwards from the island of Molokai, and a Hospital opened at Honolulu for the treatment of cases. At first there was no active antagonism, though many cases concealed themselves. Later, vigorous opposition was made to forcible segregation. The area of the settlement is several thousand acres in extent, and since 1895 has been entirely devoted to the use of the lepers, the last of the owners having been bought out by the Government in that year. A leper may be accompanied, in certain cases, by a healthy person, usually a husband or wife. Leprosy has been a ground for divorce since 1868. Of 728 cases now under observation 623 are Hawaiians, the remainder foreigners of European or Asiatic origin. During the first 20 years of the settlement, children born of leprous parents were allowed to remain in the settlement. Homes now exist in Honolulu for the non-infected children of infected persons. The birth rate in the settlement is by no means as small as might be expected. The figures available indicate that leprosy is without unfavourable influence on the fertility of the female, while it reduces that of the male.

In addition to the homes for healthy children of leprous parents, there is also a Receiving Station at Honolulu, where cases may be observed and treated for six months before being sent to the settle-

ment. The expense, which falls on a population of about 200,000, is very heavy, as shown in the appended table.

Year.	Amount spent. (dollars.)	No. of Lepers.	Cost per head.
1870	17,016	392	44·68
1875	29,698	754	39·25
1880	43,740	589	74·26
1885	54,131	663	81·65
1890	169,671	1213	139·90
1895	116,447	1087	107·12
1900	118,880	983	120·93
1904	149,325	994	150·22
1905	132,250	858	151·11
1906	96,413	828	116·39
1907	115,810	798	145·12
1908	165,662	791	209·43
1909	141,725	723	196·02
1910	162,843	614	265·21
1911	204,546	592	345·52
1912	231,778	728	318·38

It should be noted that the apparent decrease in the number of cases since 1890 is to be associated with a diminution in the number of Hawaiian natives rather than with any true fall in the incidence of the disease. From time to time there has been an agitation for local segregation in the various islands concerned, instead of the sending of all cases to Molokai. In the opinion of the author, a system of local segregation and medical inspection of the class of people that furnishes the majority of the cases would be of the greatest benefit

S. L. C.

SADIKOFF (Ivan). **Ueber die "Lepra-Frage" in Kurland.**—*Lepra.* 1914. Jan. Vol. 14. No. 3. pp. 125-130.

In 1892 there were from 100 to 120 persons suffering from leprosy in Courland (Russia). At the present time there are between 180 and 200, perhaps more, of whom 150 are accommodated in the four Leprosoriums. These institutions have existed for 17 years, but have not yet had any very decided effect in controlling the leprosy amongst the population. The steady diminution in other parts of northern Europe, where the question of the isolation of lepers has been more thoroughly faced, affords a marked contrast to the actual increase in Courland during the same period. In Norway, for instance, there were 2,833 cases in 1856. This large number had been reduced to 438 in 1907. Similar results, on a smaller scale, have been obtained in East Prussia, where leprosy has been stamped out of the Memel district since 1893, though it was steadily increasing before that date. Sadikoff devotes the greater part of his paper to a consideration of the administrative details necessary to improve the conditions obtaining in Courland, the main principles contended for being (1) a more thorough inspection and registration of the lepers living in their own homes; (2) an increased capacity for accommodation of cases in the Leprosoriums; and (3) united, instead of independent, action by the various Societies now existing for the control of leprosy.

S. L. C.

BIEHLER (R.). **Die Krebssterblichkeit unter den Leprakranken des Rigaschen städtischen Leprosoriums.** [Cancer Mortality Rate among Lepers in the Municipal Leprosorium at Riga.]—*Lepra*, 1914. Jan. Vol. 14. No. 3. pp. 141-148. With 3 figs.

The author discusses the question of the alleged relative immunity to malignant new growths in persons affected with leprosy, and quotes the findings of MUNCH-SÖEGAARD who, working in Norway, recorded a cancer death rate of 1·2 per cent. in 1,204 persons dying of leprosy at ages of 35 and upwards during 44 years, and compared this with a cancer mortality of 9·1 per cent. in the general population within the same age-limits over a period of 24 years. With the conclusion drawn from these figures, that "Leprous persons possess a relative immunity against malignant new growths," Biehler is unable to agree on the following grounds.—In the municipal Leprosorium at Riga, from October 1891 to November 1913, 473 patients have been observed. Of these, 194 have died (87 males and 107 females). Using only those cases where the results of post mortem examinations are on record, 10 patients (6·2 per cent.) out of 160 persons dying with leprosy, have been found to have suffered from malignant disease (carcinoma), or 5·2 per cent. if the figure be calculated on the whole 194 deaths. Apparently no figures are available as to the proportion of the cancer deaths to the total mortality in the general population in Russia, but some idea may be obtained from the deaths recorded in the Riga Town Hospital between 1905 and 1913. During this period there have been 422 cancer deaths (5·27 per cent.) in a total of 8,005 deaths from all causes, a figure exactly corresponding to the total cancer death rate, as compared to the total death rate from all causes in the Leprosorium. Very full notes of two male cases of well established leprosy, in which carcinoma supervened, are given, with photographs in illustration of the lesions.

The conclusions drawn are as follows:—

1. That the cancer death rate amongst lepers in the Riga Leprosorium is the same as in the Town Hospital (5·2 per cent.)
2. That in both institutions the cancer deaths occur in persons of cancer age.
3. That the proportion of cancer cases is about the same in males and females, both in the Leprosorium and in the Town Hospital.
4. That the figures furnished by the Riga Leprosorium lend no support whatever to the theory that an immunity, or even a diminished susceptibility to cancer, exists amongst persons suffering from leprosy.

S. L. C.

RAT LEPROSY.

McCOY (George W.). **Observations on naturally acquired Rat Leprosy.** —*Treasury Dept. U.S. Public Health Bull.* 1913. July. No. 61. pp. 27-30.

In San Francisco, during the years 1908–11, rat-leprosy was found in 186 of 200,000 rats examined; 38 per cent. of the infected rats were males, and 62 per cent. were females, or in nearly the same ratio as that of the healthy rats caught. Irregularly circular patches of alopecia were present in nearly half of the leprous rats, most often on the back of the head. Ulceration over subcutaneous nodules was

found in 22 per cent., the granular whitish discharge of which contained numerous acid-fast bacilli. A diffuse subcutaneous yellowish white layer resembling fat, in which were many acid-fast rods, was noted in all but four of the rats; the lower part of the sternum, the axillae and groins are the most frequent sites of this infiltration. The lymphatic glands were enlarged in 87 per cent. of the cases; yellowish granules or wedge-shaped areas containing the bacillus were commonly seen, but acid-fast rods were discovered in glands which appeared normal. The internal organs were not affected except in two instances, in which granules were found beneath the capsule of the spleen. Nephritis was discovered in 54 per cent. of the leprous rats, but in 2 per cent. only of the other rats; the bacillus was not detected in the kidneys. Acid-fast bacilli were not demonstrated in the young of infected rats.

C. B.

PRIESTLY (Henry). **Rat Leprosy in North Queensland.**—*Australasian Med. Gaz.* 1913. Nov. 1. Vol. 34. No. 18. (No. 459). pp. 405-406.

Of 220 rats examined in Townsville, North Queensland, 12 *M. decumanus* were infected with rat leprosy, six with the lymphatic and six with the musculo-cutaneous form of the disease. In several rats the infected glands were not enlarged. The bacilli were sometimes found in the apices of the lungs but not in other organs. Cultures failed. Acid-fast bacilli were discovered in Laelaps, a common acarine ectoparasite of leprous rats.

C. B.

PLAGUE.

BACOT (A. W.) & MARTIN (C. J.). **Observations on the Mechanism of the Transmission of Plague by Fleas.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 423-439. With 3 plates & 4 text figures.

The Commission for the Investigation of Plague in India came to the conclusion in 1907 that it was possible for a rat to become infected by rubbing the faeces of plague-infected fleas into recent flea-bites, but gave no opinion as to whether this was the usual method of infection. They found no bacilli in the salivary glands of the fleas, nor anywhere outside the alimentary tract. Bacot and Martin were equally unsuccessful, and it seems certain that transmission is not, as is the case with malaria and sleeping sickness, occasioned through infection of the salivary glands. They were able to infect rats by applying to recent flea-bites an emulsion of the stomach-contents of infected fleas, but obtained a higher proportion of successes (90 per cent. as against about 22 per cent.) when the cut surface of the spleen of a rat dead from plague was applied to the bites. This is attributed to a greater virulence of the bacilli in the latter case, which were found not to be taken up by human phagocytes, whereas the bacilli from the stomachs of fleas were freely ingested by phagocytes. Infection by the bacilli of flea-faeces can undoubtedly occur, but the authors show that this is not the only way in which the flea can infect. Under conditions precluding the possibility of infection by dejecta, it was found that two species of flea, *X. cheopis* and *C. fasciatus*, fed upon septicaemic blood, can transmit plague during the act of sucking, and that certain individuals suffering from a temporary obstruction at the entrance to the stomach were responsible for most of the infections obtained, probably for all.

In a proportion of infected fleas the development of the bacilli takes place to such an extent as to occlude the alimentary canal at the entrance to the stomach, choking the proventriculus and extending into the oesophagus. Fleas in this condition are not prevented from sucking blood, but they only succeed in distending the already contaminated oesophagus, and on the cessation of the pumping act some of the blood is forced back into the wound. Such fleas are persistent in their endeavours to feed, which renders them particularly dangerous. In the course of some days the culture blocking the proventriculus may autolyse and the passage again become pervious, and such fleas do not necessarily die from the obstruction. They are, however, for the time incapable of imbibing fresh fluid, and are in danger of drying if the temperature is high, and the degree of saturation of the atmosphere low. Their length of life must be short when hot, dry weather sets in, and it is suggested that this fact may to some extent explain why, in India, epidemic plague is confined to the cooler and moister seasons, and particularly why in Northern and Central India the epidemics are abruptly terminated on the onset of the hot, dry weather.

J. Henderson Smith.

TEAGUE (Oscar). **A Further Note upon the Influence of Atmospheric Temperature upon the Spread of Pneumonic Plague.**—*Philippine Jl. of Science.* Sect. B. Trop. Med. 1913. June. Vol. 8. No. 3. pp. 241-252.

Tables are given of houses at Harbin and Changchun in North Manchuria, with details as to their construction, mode of heating, and the temperatures recorded inside and outside during the month of February 1913. Many of these houses were plague-infected during the great winter epidemic of 1910–1911, and the writer finds in this record further support for his view that the atmospheric temperature affects the spread of pneumonic plague. It is rare, he states, to find in a warm climate an atmosphere with only small deficit of water-vapour, though this is very common in cold climates; and in such an atmosphere droplets of sputum persist longer than in one with a large deficit, and plague bacilli in such exhaled drops are less quickly dried and survive longer.

J. H. S.

WU LIEN TEH. [G. L. Tuck.]. **First Report of the North Manchurian Plague Prevention Service.**—*Jl. of Hygiene.* 1913. Oct. Vol. 13. No. 3. pp. 237–290. With 11 plates, map and 4 plans.

This Service was instituted by the Chinese Government after the International Plague Conference at Mukden in 1911. Its primary object is to provide a medical service (including hospitals) ready to cope with any outbreak of plague in North Manchuria and capable of studying the local conditions affecting the disease. This first Report contains a short account of previously recorded occurrences of plague in the area supervised by the Service, and a record of the work carried out since its effective organisation. This has largely consisted of an investigation into the tarbagan (*Arctomys bobac*), whose relation to the great epidemic of 1910–1911 has been frequently discussed. Statistics are given as to the extent of the trade in the skins, details regarding the natural history of the animal and the bloodsucking-parasites it harbours (which included fleas in large numbers, all of them *C. silantievi* Wagner (1898), and ticks), the mode and seasons of trappings, the influence of the trade upon the local population and other relative points. No satisfactory evidence was obtained that human plague in these regions was commonly due to plague in the tarbagan. The rumours that the animals were dying in large numbers in this or that place could never be substantiated, and no reliable authority could be obtained for the statement that tarbagan epizootics were associated in time with outbreaks of plague in man. So far there is only one instance on record of a tarbagan being found infected with *B. pestis*. That pneumonic plague once started might spread with extraordinary vehemence is shown by the evidence given in the Report of the crowding of the population in the houses, *e.g.* in one hut 15 feet square by 12 feet high more than 40 people were packed in three tiers of berths with, in winter, closed windows.

J. H. S.

SACQUÉPÉE & GARCIN. **La Peste des Ouled Fredj (Maroc). La Peste des Animaux domestiques. Remarques sur la Contagion de la Peste et sur sa Prophylaxie.**—*Arch. de Méd. et u Pharm. Militaires.* 1913. Dec. Vol. 62. No. 12. pp. 561–579.

Plague apparently has recurred for years past among the tribes of Morocco, breaking out afresh here and there each summer and dying down in the winter. In 1910 the outbreak was more persistent, and in 1911 a violent epidemic began, which attacked numerous tribes and caused 14,000 deaths among the natives during 1911–1912. The disease apparently is brought each year to the Doukalla tribe by the Draouat, a tribe living in the south-west of Morocco and migrating North each summer to assist the Doukallas in agriculture. In 1910, they did not return South in winter, and the summer of 1911 brought a fresh immigration of Draouat, and these also brought plague with them. The seriousness of the epidemic induced the French authorities to send a mission to attempt to check its spread, and this paper gives some of the observations made by these officers.

The human epidemic is apparently bubonic in type [this is not definitely stated], and *B. pestis* was found in the glands, but a striking feature was the infection of domestic animals. Two camels (one examined 24 hours after death), a sheep, a lamb, a mule (found dead), and a cat were all found infected with organisms recognised as *B. pestis* [no indication of the method of diagnosis], and the authors were convinced without having any actual proof that dogs and probably cattle also were attacked. Rats, on the other hand, were apparently scarcely attacked. No signs of unusual rat-mortality were found, and of 102 [caught alive ?] fully examined, only one was found to contain *B. pestis*. The authors conclude that a rat epizootic played no part in the spread of the human disease in this region. It is conveyed from man to man, they believe, chiefly through the agency of fleas, which the habits of the people give every opportunity of passing from one man to another or from man to animals.

[It is most regrettable that these observations, of considerable importance if correct, are not supported by satisfactory evidence or adequate details. The distribution of the buboes in man, the kinds of fleas, the methods of diagnosis (of great importance in the case of animals dead some hours before examination), the species of rats are not recorded; the evidence in regard to the rat-infestation and the amount of rat-infection is not sufficient, and there are numerous points on which fuller information would be very desirable.]

J. H. S.

SANQUIRICO. **Note concernant la Transmission de la Peste par les Rats.**—*Rev. de Méd. et d'Hyg. Trop.* 1913. Vol. 10. No. 3. pp. 133–134.

Sanquirico during an outbreak of bubonic plague, near Dinq-Hoi in Annam, could find no evidence of a rat epizootic nor indeed could he find any rats at all. At Tomerre also in 1911 no rat infection was found. He suggests that the plague is transmitted direct from case to case by the " large fleas " of that country.

J. H. S.

BACOT (A.). **A Study of the Bionomics of the Common Rat-Fleas and Other Species Associated with Human Habitations, with Special Reference to the Influence of Temperature and Humidity at Various Periods of the Life-History of the Insect.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 447–654. With 8 plates, 12 charts and 3 text-figs.

This valuable communication embodies an immense quantity of work carefully designed and accurately carried out. It is impossible to do more than indicate the scope of the observations made and note some of the more important conclusions reached. The species chiefly studied were *C. fasciatus*, *P. irritans*, *Ct. canis*, *Leptopsylla musculi* and *X. cheopis*, and these were examined in the egg, larval, cocoon, and adult stages under varying conditions of temperature, humidity, food, etc.

In comparison with the later stages in the life-history, eggs are relatively insusceptible to external influences. Low temperature reduces the number of eggs of *C. fasciatus*, *P. irritans*, and *X. cheopis* which hatch, but 50 per cent. of eggs of the first hatched at 40·9° F., when all of the other two failed. A temperature of over 65 to 80° F., with humidity of ·70 or over is most favourable, and a temperature of over 60° with a humidity of below ·50–·55 is harmful.

The larval period falls into two stages, the active phase and that passed in the cocoon. The duration of the active period is very variable, from 15–114 days for *C. fasciatus*, 9–202 for *P. irritans*, and 12–84 for *X. cheopis*, and although low temperature favours the postponement of spinning the cocoon, there is a marked individual variation in this respect. Active larvae could survive for over a month without food under favourable external conditions. With food and a reasonable temperature a high humidity is desirable, and local moistening (*e.g.* sweat or urine of animals) may convert an impossible into a favourable site. The faeces of adult fleas are a possible diet, and perhaps in the case of *C. fasciatus* a necessary part of the food.

The cocoon period varied from eight days to over a year for *C. fasciatus*, 7–239 days for *P. irritans*, 7–182 days for *X. cheopis*, and 7–354 days for *Ct. canis*, and probably for a considerable time the flea is still in the larval stage (with *C. fasciatus* even up to 600 days). Fall in temperature appears to favour a lengthening of the cocoon stage in the case of *X. cheopis* and *P. irritans*. *Ct. canis* tends to spend the winter in the cocoon, and *C. fasciatus* frequently does so also, though some individuals are in the habit of aestivating during the hot months and emerging in autumn. Individual variation ensures the emergence of the adult fleas over a wide interval of time.

No evidence was obtained that the adult flea feeds on other than warm-blooded animals, and Bacot is of opinion that this is essential to reproduction. The amount of food taken affects the number of eggs, but not apparently the fertility of those laid. The adult lives for months when fed, *e.g. C. fasciatus* for 106 days, *X. cheopis* 100, *P. irritans* 513, *Ct. canis* 234, and even when unfed, if kept in nearly saturated air at 45–50° F., *C. fasciatus* may live for 95 days, *X. cheopis* 38 days, *Ct. canis* 58, and *P. irritans* for 125. It follows, therefore, that fleas in the complete cycle from egg to adult may survive in situations where there has been no host for very long periods, viz.,

C. fasciatus for 22 months, *P. irritans* 19 months, *X. cheopis* 10 months *Ct. canis* 18 months, and *C. gallinae* 12 months.

J. H. S.

Hirst (L. Fabian). **Identification of Rat-Fleas in Colombo.** [Memoranda.]—*British Med. Jl.* 1914. Jan. 10. p. 85.

The fleas found were identified by the Hon. N. C. Rothschild as *Xenopsylla astia*, and the fleas found in Madras, also on *M. rattus*, proved to be of the same species and not, as hitherto believed, *X. cheopis*, which it resembles very closely. The author suggests that in view of the freedom of Madras and Colombo from plague, investigation into the geographical distribution of these fleas and their infectivity as plague-porters might throw some light on the epidemiology of plague.

J. H. S.

Bacot (A. W.). **On the Survival of Bacteria in the Alimentary Canal of Fleas during Metamorphosis from Larva to Adult.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 655–681.

It was found that the alimentary canal of flea larvae may become infected with *B. pyocyaneus*, *B. enteritidis* Gaertner, *Staph. albus* and *Staph. aureus* (not with *B. violaceus*). This infection of the gut may persist till the resting period of the larva, but no satisfactory evidence was obtained that the infection lasts through the pupal stage. The conditions in the larval gut do not appear to be favourable to the growth of *B. pestis*. The plague bacillus was frequently found in the dejecta of adult infected *X. cheopis* and *C. fasciatus*, but only rarely in the larval gut, and then not in large numbers. No massive growth such as occurs in the adult flea was ever met with.

J. H. S.

Rowland (Sydney). **The Influence of Cultivation in Serum-containing Media upon the Virulence and Immunising Properties of the Plague Bacillus.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 403–411. With 1 plate.

Bacilli which have been grown on broth become notably more virulent when propagated on heated horse-serum, and a similar increase in virulence is obtained when they are grown on a synthetic medium, to which crystalline serum-albumen is added. If, however, they are grown on fresh serum (in which they multiply much less well and are subject to a considerable preliminary lysis), the virulence is markedly reduced. The antigenic properties of the organism are apparently also altered by the medium of growth. Rats immunised against broth-bacilli by a single injection of nucleoproteid from broth bacilli are much less protected against bacilli grown in serum. It is possible by injection of living virulent broth bacilli to vaccinate against serum-grown bacilli, but it is also possible to obtain an effective immunisation when the nucleoproteid used to vaccinate is prepared from bacilli grown on heated serum, and this immunity holds good against broth as well as serum bacilli. As the race of bacilli which the flea imbibes from the rat is a serum race, vaccination with broth

bacilli would appear to be a less efficient method of immunisation than vaccination with serum-bacilli. A vaccine from a serum race, however, loses in efficiency when it is prepared in the manner of HAFFKINE by heating the whole bacilli.

J. H. S.

ROWLAND (Sydney). **Influence of the Medium in which *B. pestis* is propagated upon its Virulence.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 440–446.

With the standard dose of plague used in these experiments, broth cultures are consistently more virulent than agar cultures, but the addition of a small proportion of serum-protein, or the presence of egg-white or of crystallised egg-albumen, raises the virulence very markedly higher still. Inoculation, however, of the agar, broth or heated serum culture into fresh rat-serum produces a race of lower virulence than that from which it is derived, whereas organisms taken from the spleen of a plague-rat undergo no significant reduction of virulence when propagated on fresh rat serum. Body organisms accordingly can resist, at least for a time, the depressing action of fresh serum, and it is suggested that infection of a rat follows or not according as the infecting organisms succeed or fail in breeding out a strain which can resist the depressant action of the serum. Some success has been obtained in artificially producing such resistant races by propagating on a medium containing minced spleen or spleen-juice, together with fresh rat serum.

J. H. S.

BROOKS (Ralph St. John). **The Influence of the Medium in which the Plague Bacillus is propagated upon the Facility with which it is ingested by Human Leucocytes.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 412–417.

Virulent *B. pestis* is readily taken up by human leucocytes, whether it be grown on broth agar or in heated serum from rat, man or guinea-pig. When the bacillus, however, is taken directly from the glands, or blood of a rat dead of plague, phagocytosis is greatly reduced, and this reduction, persisting for several subcultures on agar, is eventually lost again after continued cultivation on agar. A similar greatly reduced phagocytosis is obtained when the bacillus is sown from heated horse serum on fresh horse or rat-serum, and the fall in phagocytosis is shown not to be due to any action on the leucocytes of toxic substances in the mixtures.

J. H. S.

ROWLAND (Sydney). **The Morphology of the Plague Bacillus.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 418–422. With 7 plates.

Plague bacilli show an immense diversity of form, simulating micrococci, streptococci, streptothrices, moulds, &c. Grown in broth at 20° C., they possess no capsule, though under certain conditions a definite capsule may be observed, e.g. at the site of inoculation in animals. When grown at 36°, however, even in broth, a proportion

of the organisms may be seen in appropriate dark-ground illumination of an Indian ink emulsion to be surrounded by an envelope, indefinite in outline and apparently of viscid consistency. Grown in serum-containing media, the number of organisms possessing such an envelope is strikingly increased, and it is well-marked in preparations from the spleen of a rat dead of plague. The envelope is soluble in dilute alkalis, and disappears in fresh normal rat serum or immune horse serum at 37°. An excellent series of photographs illustrates the pleomorphism and the envelope under various conditions.

J. H. S.

VAN DRIEL (B. M.). **Pestbestrijding te Shanghai.** [Anti-Plague Measures in Shanghai.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 5. pp. 656-671. With 1 map.

An account of the measures adopted by the Health Department to protect the International Settlement from plague. This portion of Shanghai includes about half a million Chinese and 15,000 foreigners, and is continually exposed to infection by the juxtaposition, without dividing line, on the South-west of the Chapei district, one of the most insanitary districts of the city. The anti-plague measures are based on the dictum, which is continually kept before the native mind, that a "rat-free house is a plague-free house"; and they are organised into a constant system of vigilance. A daily search for dead rats is made, with regular examination of the corpses; rat and fly-proof receptacles for offal and rubbish are provided; a barrier of "rat-proof" houses, at least 250 feet wide, is established between the Settlement and the Chapei district, and every opportunity is taken to increase the number of "rat-proof" houses within the district. "Permanent rat-proofing" consists in the main of lifting the floors and filling all spaces with tar macadam, on which the planks are relaid directly. Double walls are forbidden, but it has proved more difficult to deal with the storing of goods under the roofs in the upper ceilings, and a compromise has had to be effected in this respect. In 1912 154,005 rats were taken alive, and 14,988 found dead (95 of the latter proved to be plague-infected). The rats were 70 per cent. *M. rattus*, and 30 per cent. *M. decumanus*, and the fleas were *X. cheopis* and *C. fasciatus*.

J. H. S.

GIOSEFFI (M.). **La Difesa contro la Peste nel Porto di Trieste ed in quello di Genova. Peste Umana e Peste Murina.** [Plague Measures at Trieste and Genoa; Plague in Man and Rats.] —*Gazz. d. Ospedali e d. Cliniche.* 1913. Dec. 4. Vol. 34. No. 145. pp. 1519–1520.

With reference to a case of plague which occurred in November 1913 amongst the workers on a ship from Buenos Ayres, Gioseffi recalls four instances of bubonic plague at Trieste since 1906, which are, like this one, attributable to the rats on ships from foreign ports. He compares the action of the Trieste port authorities unfavourably with that at Genoa, in that at Trieste the rats on ships from infected or suspected ports are examined only after plague has been communicated to man,

whereas at Genoa the rats are systematically examined at the docks and on the ships, with the object of preventing human plague from arising.

J. H. S.

Simpson (French). **Rat-Proofing a Municipal Sewer System. A Report of an Investigation to find a Practical Method of Rat-Proofing the Sewer System of San Francisco.**—*U.S. Public Health Rep.* 1913. Oct. 31. Vol. 28. No. 44. pp. 2283–2290.

City-sewers provide a permanent harbouring place for rats, and as ordinarily constructed present little obstruction to their ingress or egress. In San Francisco the rats enter or leave the sewers chiefly by the street corner-basins, which are designed to receive the flood-water from the streets, and to allow the sediment to fall out before the fluid passes on into the sewer. They are supposed to check the passage of rats by acting as a water-trap, but the water, when present, serves as a breeding place for mosquitos, and in practice the trap is usually nearly dry. The several types of catch-basin in local use are described, and a new type is recommended, the essential point of which is that the communication between the street and with the sewer shall be at least three feet in vertical height, with quite smooth walls. It was found on experiment, that the ordinary sewer rat (*M. norvegicus*) can jump two but not three feet, and this height would be sufficient to prevent egress from the sewers, though not checking ingress.

J. H. S.

Grysez (V.) & Certain (B.). **Sur la Vaccination contre la Peste par la Voie conjonctivale à l'Aide de Bacilles sensibilisés vivants.**—*Compt. Rend. Soc. Biol.* 1913. Oct. 24. Vol. 75. No. 29. pp. 281–283.

Guinea-pigs were inoculated (*a*) on the conjunctiva, (*b*) subcutaneously, with graduated doses of a plague vaccine sensitised by Besredka's method. (No information is given as to the actual size of dose inoculated). The surviving animals were subsequently inoculated with 1–2000th part of an agar culture of *B. pestis*, a dose which killed controls in 3–5 days. Part of these animals were inoculated on the conjunctiva, and it was found that when the preliminary dose of vaccine was large enough, immunity to the second conjunctival dose had developed by the 16th day and persisted to at least the 52nd day; and some degree of immunity was obtained in animals receiving their first injection subcutaneously. The other animals were inoculated subcutaneously, with uncertain results. Vaccination by the conjunctiva was not found to have any practical advantage over the subcutaneous route with this vaccine.

J. H. S.

Busch. **Ueber "Ratt-Entrit."**—*Deut. Militärärzt. Zeitschr.* 1913. Dec. 20. Vol. 42. No. 24. pp. 932–935.

Ratt-entrit is a commercial preparation, which is said to kill rats and mice by destroying the mucosa of the alimentary tract after ingestion by these animals, and allowing the contained bacteria to

invade the tissues. It was found by Busch to contain an organism of the Gaertner type, and to kill mice in cages within six days.

J. H. S.

Tulloch (W. J.). **The Bacteriological Diagnosis of a Case of Plague.**—*Lancet.* 1913. Nov. 8. p. 1318.

An account of a case of glandular enlargement with subsequent fatal pneumonia, in which an organism, stated to conform to *B. pestis* on subsequent examination, was isolated from the blood and from guinea-pigs into which the blood was injected, as also from the spleen, liver and lung after death. The serum of the patient agglutinated *B. typhosus* in dilution of 1–100. Stress is laid on the value of blood-cultures in doubtful cases of plague.

J. H. S.

Bacot (A. W.). **The Effect of the Vapours of Various Insecticides upon Fleas (*Ceratophyllus fasciatus* and *Xenopsylla cheopis*) at each Stage in their Life History and upon the Bed-bug (*Cimex lectularius*) in its Larval Stage.**—*Jl. of Hygiene. Plague Supplement* iii. 1914. Jan. 14. pp. 665–681. With 1 text figure.

The insecticides tried were solutions of pure phenol, lysol and formalin, commercial benzine, paraffin oil, flake naphthalene and crushed camphor. For practical purposes naphthalene was found to be the most generally effective agent in all stages of the flea cycle; it can be passed into cracks or crevices by dissolving in benzine. For rat-holes it is suggested that a soap-carbolic emulsion or soap-petroleum emulsion, to which flake naphthalene is added, should be used.

J. H. S.

UNDULANT FEVER.

Epidemiology.

Séjournant (J.). **La Fièvre Méditerranéenne en Algérie en 1912.**— *Ann. Inst. Pasteur.* 1913. Oct. Vol. 27. No. 10. pp. 828-838.

The author gives the result of an investigation made in 1912 on the prevalence of undulant fever in Algeria, and the distribution of the disease by means of animals. Following an inquiry made in 1907, which showed the disease to be very prevalent, measures were taken on the advice of Dr. Ed. Sergent to prohibit the importation of infected goats from Malta and to notify the disease. It was interesting to see after five years the result of these measures, though owing to the improved technique of Nègre and Raynaud, and the knowledge of a *para-melitensis* infection, the comparison is not quite accurate. Young cultures were employed and Sergent's technique was followed: both microscopic and macroscopic results were read off after six hours; the dilution of the milk was 1/30, of the serum 1/60. In Algiers, out of 492 goats examined, in only 20 were positive milk reactions obtained, nine with *M. melitensis*, nine with *M. para-melitensis* and two with both. Thus the percentage of infected goats was very small, and no fresh human case occurred during the year. But, in spite of the interdiction of entry of Maltese goats, a few foci of infection were found; these were traced to goats received from Spain, and the fact that an equal number of the animals was infected with the *para-melitensis* organism is of great importance. In Kléber there was a small human epidemic, nine men and two women. In one family (L) four out of five were attacked; these possessed no goats, and drank only boiled milk from a house where neither men nor goats were infected, but all the members of the family preceding them in this house had suffered from the fever, including the goat herd. The contagion was probably a local one from the stable contaminated by the milk of the infected goats.

The following interesting summary is given:—

Animals.	Total.	Examined.		Serum Agglutinated with		Total.		Observations.
				M. melitensis.	*M. para-melitensis.*			
Goats	700	56	8 %	3	1	4	7 %	In whole village.
Horses & Mules	?	9	—	1	3	4		In houses only of those sick during last five years.
Cattle	?	2	—	—	1	1		
Sheep	?	4	—	1	—	1		
Rabbits	—	3	—	—	1	1		
Cats	—	2	—	—	1	1		
		76		5	7	12		

A detailed table is given of the cases, with the serum and milk reaction of these various animals. A culture obtained from the urine

of Mrs. L. (haemoculture negative) agglutinated with specific immune serum. In Sainte-Leonie, a village near to Kléber, isolated cases occurred yearly, the two last being directly traceable to Kléber.

Among the animals from the infected houses an important proportion were able to agglutinate both strains (*M. melitensis* and *M. para-melitensis*), especially horses, favouring SERGENT's hypothesis of stable infection, but it is also possible that they may become secondarily infected from the urine of people suffering from the disease. In conclusion, it is stated that in the urban districts infection is generally from ingestion of infected milk, that in rural districts infection from stables, etc., plays an important part, not only among goats, but in other domestic animals, and that the virus may remain there a long time. People suffering or convalescent from the disease should not, therefore, be admitted into stables or dairies. Interdiction of importation of infected goats from Spain should be enforced, and serum and milk reactions should be carried out at regular intervals, and hygienic methods taught. The *M. para-melitensis* has not yet been isolated from the sick with the exception of the case studied by NÈGRE and RAYNAUD in their laboratory.

[A case of *M. para-melitensis* fever is referred to in this *Bulletin*, Vol. 1, p. 579, in which a lady contracted the fever in the South of France and though the serum agglutinated in dilution of 1/400, no culture could be obtained from the blood or urine.]

P. W. Bassett-Smith.

GOLINI (O.). **Una Epidemia di Febbre Mediterranea nella Frazione di Montepescali (prov. Grosseto).**—*Policlinco.* Sez. pratica. 1913. Nov. 2. Vol. 20. No. 44. pp. 1596-1600.

It has been shown by recent research that undulant fever is prevalent in Tuscany, and many cases have been proved to exist in Pisa, Lucia, and other places. In 1909, Professor MEMMI, director of the hospital at Grosseto, showed that many of the irregular fevers met with there, with intestinal symptoms, sweats, etc. were due to infection by the *M. melitensis*. In this region the general sanitation and hygienic conditions were bad. Probably owing to the great variety of the symptoms many more cases occurred than were diagnosed. Goats' milk was commonly used. An outbreak of the disease at Montepescali, which was of short duration, is here reported. The infection showed no sex preference, and the ages ranged from 17 to 57 years; some of the cases were very severe, others very mild of the ambulant type. With reference to the cause of the outbreak, it was found that cases occurred in the same family, the members of which slept in the same bed, ate off the same plate, drank out of the same glass, and did not take elementary hygienic measures. No evidence of infection by means of the goats was obtained, it being stated that the greater number of the infected never drank goats' milk, or if they did that it was boiled. The author concludes that infection was a place or personal one, probably through the ambulant cases. Carefully conducted sero-diagnostic reactions were carried out in each case. These he divides into three groups: (1) Severe cases with long course; (2) mild cases; (3) ambulant cases with violent neuralgia. Seven acute cases are described in great detail. In the ambulant cases the agglutination reaction ranged from 1/100 to 1/600.

[As the general hygienic conditions were so unfavourable, direct infection from the sick to the healthy is not unlikely through contaminated urine; it is also impossible to receive without doubt the assurance that all the goats' milk was boiled before being used.]

P. W. B.-S.

DELLA VIDA (Mario Levi). **Alcune Osservazioni sopra una Epidemia di Febbre Mediterranea in un Comune della Provincia di Roma.**—*Ann. d'Igiene Sperimentale.* 1913. Vol. 23. (New Series). No. 3. pp. 263-280. With 1 map and 2 figs.

In the month of April, 1913, Dr. SENSI called attention to a small epidemic of undulant fever which had broken out at Grotte S. Stefano, in the province of Rome. The author was sent to enquire into the cause of this outbreak and how to prevent its extension. Twelve cases were quickly notified occurring close together. There were many goats, but the milk was rarely used by the people. In Grotte S. Stefano it was ascertained that late in 1911 a goat bought from a travelling vendor was introduced into the herd of goats. At the time of the enquiry 61·9 per cent. of the animals in this herd were shown to be infected. The infection slowly spread widely from this centre to other herds and then to man. From a careful enquiry, the author had no doubt that 20 cases originated from the first herd; three drank goats' milk and were thus infected, 13 cases probably contracted the disease from the infected dust, and four by direct contact from infected individuals. In the second herd at Magugnano 53 per cent. were infected; this caused a local epidemic of 11 cases all infected by the alimentary canal. The author gives very fully the epidemiological features of the epidemic and is quite convinced that a large percentage of the cases contracted the disease by other methods than drinking infected milk; the contamination of the soil by the affected goats and also by ambulant human cases, rendering, according to him, infection probable by inoculation, especially in the absence of ordinary hygienic precautions. He discusses the value of the various diagnostic tests, and draws attention to the necessity of the early recognition of sporadic cases, the introduction of State legislation for notification of cases, and the restriction of the importation of infected goats.

P. W. B.-S.

SANGIORGI (G.). **Melitococcia in Piemonte.** [Undulant Fever in Piedmont.]—*Pathologica.* 1913. Sept. 15. Vol. 5. No. 117. pp. 552-555.

The author describes a small epidemic of undulant fever at Racconigi. There were five cases, four being in the same family. In one case the *M. melitensis* was isolated from the blood, and the agglutination test was positive in dilutions of 1/200, 1/400, and 1/600 respectively, in three cases when examined with both the laboratory stock culture and with the freshly isolated organism. Inoculations into guinea-pigs were carried out, and from two of these the *M. melitensis* was recovered in pure culture. On investigation it was found that previously three other cases had occurred in which the fever had been slight. These at the time of examination were in

perfect health, all three giving positive agglutination reactions at 1/100 and 1/200. One of these, who had been ill a year and a half previously, the author considers to have been the cause of the infection, being at the time a "chronic carrier." He emphasises the importance of the work of SHAW and MISSIROLI in drawing attention to the frequency of these carrier cases, which are a great source of danger to the community, and he points out that hygienists must consider this source of infection as well as the use of milk of goats and cows. He also lays stress upon the value of WRIGHT's serum test in discovering cases that are likely to be carriers of the infection.

P. W. B.-S.

SUMMA. **Zum Maltafieber in Südwestafrika.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 838-840.

Cases of undulant fever have during the last few years been frequently diagnosed in German South-West Africa by agglutination methods; the author describes a case in which the *M. melitensis* was isolated from the blood, definitely confirming the serum test. The case was that of a doctor who suffered from vague rheumatic pains and intestinal symptoms for a year. Treatment for these was not successful, and he was admitted to hospital. His serum gave a positive agglutination in dilution of 1·160, and from 5 cc. of blood the micrococcus was isolated. Clinically there was no enlargement of liver and spleen, or continued pyrexia, but articular pains were marked. The patient drank unboiled milk freely, but had also been working with cultures of *M. melitensis* in the laboratory, so that the exact mode of infection is doubtful. It is stated that cases of this fever can no longer be looked upon as rare in South-West Africa, and that many are mistaken for malaria. Collargol given as a germicide in 0·15 gm. doses intravenously will cut short the fever in some cases, but has produced violent toxic nephritis with suppression of urine. Pyramidon in small frequent doses is stated to have favourably influenced the course of the disease in a child aged eight months [no details are given.]

P. W. B.-S.

WELLMAN (C.), EUSTIS (A.), & SCHOCHET (S. S.). **Malta Fever in Louisiana. Report of a Positive Case in a Series of Forty-Six Agglutination Tests with *Microbacillus melitensis*.**—*American Jl. of Trop. Dis. & Prev. Med.* 1913. Nov. Vol. 1. No. 5. pp. 393-396. With 1 chart.

The case of a man aged 50, who contracted undulant fever in Jackson County, Texas, is described. The patient had previously suffered from malaria and amoebic dysentery. The attack commenced in March 1913. There was prolonged irregular fever, with sweats and enlargement of the spleen and, towards the end, acute arthritis of the left elbow. The blood picture showed a marked polymorphonuclear leucocytosis on the admission to hospital in New Orleans in June, but no sign of sepsis could be detected nor evidence of dysentery. His serum agglutinated at 1/40 in 30 minutes with a culture supplied by BASSETT-SMITH (strain G.), and in July a pure culture of the *M. melitensis* was obtained from the blood. The case died from broncho-

pneumonia in August. It is reported as being the first definitely diagnosed in Lousiana.

[Polymorphonuclear leucocytosis has not before been noted in uncomplicated cases of undulant fever. The term *Microbacillus melitensis* is used; this alteration in the designation of the micrococcus is neither warranted nor desirable.]

P. W. B.-S.

LEGER (Marcel), & DOMINICI-URBANI (Ch.). **Documents relatifs à l'Extension de la Mélitococcie en Corse.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 673-678.

An enquiry into the origin and distribution of undulant fever in Corsica has been carefully carried out by the authors, who obtained much written, verbal, and ocular evidence of the disease. They found that undulant fever is no longer limited to a small centre in the north, but is now widely distributed throughout the island. The infection was probably imported by infected goats from Malta to the north of the island, where cases are still most numerous; by the periodic migration of the goats during the summer into the central part the herds mix and the infection spreads. The earliest reported cases in man were noted in 1892, in the form of an epidemic the true nature of which was not recognised at the time. Measures similar to those that have been so successful in Algeria and Tunis are required to be put in force as soon as possible, so as to eradicate the disease from both goats and man.

P. W. B.-S.

AGGLUTINATION AND SERUM REACTIONS.

KENNEDY (J. C.). **Preliminary Note on the Presence of Agglutinins for the *Micrococcus melitensis* in the Milk and Blood-Serum of Cows in London.**—*Jl. R. Army Med. Corps.* 1914. Jan. Vol. 22. No. 1. pp. 9-14. With 1 illustration.

In testing in London some samples of goats' milk a control of cows' milk was used. To the surprise of the author this gave a complete positive reaction in a 1/20 dilution with the *M. melitensis*. Milk from the same source was tested on eleven different occasions, giving positive results in nine. Twelve other samples from mixed milks obtained in London gave complete reactions in four. Samples of milk taken direct from cows were then tested; one reacted up to 1/300, and the milk of nine gave incomplete reaction in 1/20 dilutions. From a second dairy with 13 cows two gave very marked reactions. The blood serum of two of the cows giving high lacto-reactions was also found to react positively in dilutions of 1/200 and 1/250. An attempt was made to isolate the *M. melitensis* from the milk by plating; this was unsuccessful. The strain of *M. melitensis* showed no sign of auto-agglutination, and did not react to normal serum in higher dilutions than 1/10. The technique employed was as follows:—A strong emulsion was made in saline solution from a 3–4 day old culture on agar. The milk, to which a trace of formalin had been added, was diluted with saline solution. One part of the diluted milk was mixed with an equal part of the emulsion and was then put up in sedimentation tubes at room

temperature, and the result read off after 20 hours. No definite observations were made as to the effect of heating the milk to cut out non-specific agglutinins, but using whey instead of the whole milk did not alter the reactions; therefore agglutination of the oil globules, which sometimes takes place, was not the cause of the reaction. The reaction was not dependant on the acidity of the milk, and it was not due to preservatives added. Filtration of the milk through Berkefeld or Doulton candles reduced or prevented the reaction; it appeared that the agglutinins were held back by the filter.

Summary.—"1. Agglutination of the *Micrococus melitensis* is produced by high dilutions of both milk and the serum of certain cows in London.

"2. Of thirteen samples of 'mixed' milk from thirteen different dairies in London, five gave a positive reaction, one an incomplete, and seven a negative.

"3. The milk of three out of twenty-two cows gave a complete positive reaction, that of one was indefinite, and the remainder were completely negative.

"4. The serum of two (the only ones tested) of the three cows whose milk gave a positive reaction also had a high agglutinative value for the *M. melitensis.*

"5. The *M. melitensis* has not been isolated from the milk on the few occasions on which it has been plated out."

The author does not wish it to be considered that the milk is necessarily capable of transmitting undulant fever, but that the agglutination reaction of the milk may have some other explanation than that the cows were infected with the *M. melitensis.* He was unable to complete his research as he was immediately proceeding to India.

[This most interesting piece of work bears out the observations of Martel, Tanon and Chrètien, who state that the lacto-reaction is unreliable for diagnosis. It is highly probable that these anomalous results are not due to any want in the specificity of the reaction, but to some error of technique. The fact that positive serum reactions were obtained in two of the cows examined make it more difficult to explain; the high agglutinations which are found in several animals can be cut out by heating. Several workers lately have recommended for use cultures not more than 48 hours old; those used were of 3–4 days' growth—when possibly agglutination is more easily brought about. That the cows are really infected with the micrococcus is unlikely, as the positive reactions were so frequent, and human infections from the London milks are practically unknown, which would certainly not have been the case if the infecting organism had been present.]

P. W. B.–S.

Martel, Tanon & Chrètien. **La Valeur de l'Agglutination du *Micrococcus Melitensis* par le Sérum Sanguin en particulier chez les Chèvres.**—*Presse Méd.* 1913. Aug. 20. No. 68. pp. 685-686.

The authors believe that the agglutination test for proving a *M. melitensis* infection in man is uncertain and sometimes misleading, even when heated serum is used; they also consider that the same errors are more likely to occur in the case of goats. Of agglutinations obtained with serum, urine, and milk, they hold that the serum is the only one to employ, and as this gives errors, much more so will the urine which is rich in salts, extractives, mucus, and albumen which when in

contact with the specific organisms may cause them to mass together. Milk is much too rich in albuminoid matter and globules of fat for it to give correct results; it is also extremely variable in its composition from day to day. They experimented on three goats; before any injections were given, the serum of each animal was tested for agglutinins with the following results:—

	No. 1.	No. 2.	No. 3.	Dilution.
M. melitensis ..	Nil	Nil	Nil	.. 1/30 to 1/50
Streptococcus ..	Nil	Nil	Nil	.. 1/30
B. typhosus ..	Aggl.	Nil	Nil	.. 1/30 to 1/50
B. cholera ..	Nil	Aggl.	Nil	.. 1/30
B. mallei ..	Nil	Nil	Nil	.. 1/30
B. coli com. ..	Aggl.	Aggl.	Nil	.. 1/30

The first goat was injected with *B. typhosus* and produced agglutinins for *B. typhosus*, *B. coli* and *M. melitensis*, but the agglutinins were destroyed by heating the serum to 57° C. for half an hour. The second goat was injected three times with cultures of *S. albus*, which provoked the formation of agglutinins for *M. melitensis* up to a dilution of 1/100; this disappeared on heating the serum. To the food of the third goat was added cultures of *Staphylococcus albus*; the animal died on the eighth day, but the serum before death showed agglutination for *M. melitensis* and *B. coli*; this also was destroyed by heating the serum. This experiment led them to believe that in naturally infected goats modifications of the agglutinins may be caused by intestinal infections. Experiments with guinea-pigs showed that other organisms gave rise to agglutination of the *M. melitensis*, up to 1/100 dilutions of the serum, but with these animals heating did not cause the disappearance of the antibody. From previous work and the results of these experiments they have drawn up the following conclusions:—

(1). Typhoid infection experimentally produced causes the formation of active agglutination for the *M. melitensis*. The serum of infected goats is active up to dilutions of 1/50, but the non-specific agglutinins disappear after heating the serum for half an hour at 57° C.

(2). Experimental staphylococcic infection determined the active production of agglutinins for *M. melitensis*. The goat's serum agglutinates feebly when the infection is slight.

(3). The agglutination of the *M. melitensis* by the serum of goats up to 1–50 does not prove that the goat is infected with the micrococcus.

(4). Heating the serum as recommended by NÈGRE and RAYNAUD does not prevent all chances of error.

(5). For the diagnosis of undulant fever in goats it is indispensable to carry the agglutination up to 1/100; for the diagnosis in man they recommend the use of dilutions from 1/50 to 1/150, and the serum should always be heated for half an hour to 57° C.

(6). Blood culture makes a certain diagnosis.

(7). It is wise in all cases of agglutination, as a general prophylactic measure, to condemn the use of raw milk and cheese made with milk of the suspected goats.

P. W. B.–S.

NATALE SALVATORE. **Sul Valore da assegnarsi alla Siero-diagnosi nella Febbre Mediterranea.** [Upon the Value to be assigned to Sero-diagnosis in Undulant Fever.]—*Policlinico.* Sez. practica. 1913. Dec. 21. No. 51. Vol. 20. pp. 1852-1856.

After some preliminary observations the author points out the great

variation in the amount of agglutination observed in some cases from day to day, the importance of using cultures that do not show any tendency to auto-agglutination, and the avoidance of strains of *M. paramelitensis* which, as shown by NICOLLE and CONOR, give negative reactions in true cases of undulant fever. The results of 80 cases tested during 1912, at the Pathological Institute in Palermo, are given. A 24 hour growth of a strain of *M. melitensis* was used for the emulsion, which did not give any auto-agglutination, the reactions being controlled by normal sera and sera of immunised animals injected with TRAMBUSTI's nucleo-proteid. The microscopical method was used with observations of from half an hour to six hours. The cases were divided into groups (given in a table). Those that gave positive reactions with (1) *M. melitensis*, (2) *B. typhosus*, (3) *B. paratyphosus*, (4) *B. coli*; and (5) 36 that gave no definite reactions with either.

1st Group: Fifteen cases agglutinating with *M. melitensis* from 1/60 to 1/500; some of these gave reactions with *B. typhosus*, *paratyphosus* and *coli*, but not in higher dilutions than 1/20.

2nd Group: Ten cases agglutinating positively with *B. typhosus* from 1/100 to 1/500; serum reactions were obtained for *M. melitensis* up to 1/15. Controls of normal serum agglutinated the same up to 1/25 and the immunised serum up to 1/5,000.

3rd Group: Eight cases agglutinating *B. para-typhosus* to from 1/80 to 1/1,000. None reacted with *M. melitensis* in higher dilutions than 1/20. Normal sera agglutinated the latter to 1/25 and the immunised sera from 1/1,000 to 1/5,000.

4th Group: Eleven cases agglutinating *B. coli* from 1/25 to 1/120. None reacted with *M. melitensis* in higher dilutions than 1–20.

5th Group: Thirty-six cases gave no agglutination with *M. melitensis* above 1/20.

From these observations he concludes that a 1/40 dilution of the serum can be used with safety for diagnosis for undulant fever, but it is better to carry it much higher.

P. W. B.-S.

MISCELLANEOUS.

BARTET & DEFRESSINE. **Un Cas Mortel de Fièvre Ondulante observé à Ajaccio (Corse).**—*Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9. pp. 601-605.

The case described is of considerable interest. A man aged 45 years contracted undulant fever in December 1912, apparently by drinking milk from infected goats in the vicinity of Ajaccio. He complained early of night sweats, epigastric discomfort and articular pains. The correct diagnosis was not made until June, 1913, when a sample of his blood sent to Toulon gave definite agglutination up to 1/100 with *M. melitensis*, with both heated and un-heated serum. At that time no abnormality was found physically in heart, lungs, spleen and liver, but the febrile and other symptoms persisted. Preceding his death in August, probably from a failing heart, due to the prolonged fever, enlargement of the liver and oedema were very marked. At the post-mortem the Micrococcus was demonstrated in the liver and spleen. In this case the marked dyspeptic symptoms at first caused an error

in the diagnosis, and the authors point out that since the disease has become better recognised in Corsica the mortality is estimated as from 6–10 per cent., instead of the 2–3 per cent. usually given. Infection is not always due to drinking unboiled milk, but sometimes occurs from eating infected cheese and from direct inoculation of the hands by the milk containing the living micrococcus.

P. W. B.-S.

CAZENEUVE (H.). **Ostéo-périostite post-mélitococcique.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 668-672.

The clinical notes are given of an officer aged 27 who contracted undulant fever in Morocco. The following year painful periosteal swellings appeared over the lower end of the left femur and upper part of the right tibia. The patient finally returned to duty 20 months after the onset of the fever. [Similar cases during convalescence from undulant fever have been described by CANTALOUBE and others, and are mentioned in text books.] P. W. B.-S.

MARSHALL (C. H.). **Experiments with the *Micrococcus melitensis.***—*Jl. London School Trop. Med.* 1913. Nov. Vol. 2. Part 3, pp. 220-223.

The author gives the results of some animal inoculation experiments made by himself with the *M. melitensis*. He obtained five strains from EYRE: (1) and (5) from Malta milk, (2) and (4) BASSETT-SMITH, and (3) from a fatal case (RICHARDS). Of the five strains only No. (4) proved of a high degree of virulence, killing a guinea-pig after intra-cerebral injection in 24 hours, guinea-pigs with (1), (2) and (3) living seven, five, and five days respectively. The virulence of No. (3) was raised by passage and these two, (3) and (4), were used for the experiments. Examinations made during the periods of observation showed that infection of the urinary tract is invariably of late appearance, as in none of the animals could the organism be demonstrated from the bladder or urine. [The kidneys do not appear to have been examined.] The effect of "606" upon the *M. melitensis* in the infected animals was tested. A few minutes after the injection of the virulent culture a dose of "606" was given subcutaneously or into a vein. Two guinea-pigs and ten rabbits were treated. The experiments demonstrated (1) that the slightly increased virulence obtained by a few passages of the *M. melitensis* through guinea-pigs did not increase the virulence of the strain for rabbits; (2) That "606" appeared to have a definite inhibitory effect on the *M. melitensis* when injected into the experimental animal shortly after the inoculation of the organism; (3) That when the dose of "606" was insufficient to prevent infection a subsequent dose appeared to have had a definite curative effect.

P. W. B.-S.

TREATMENT.

HITCHENS (A. Parker). **Serums and Vaccines in the Prevention and Treatment of Undulant Fever.**—*American Jl. of Trop. Dis. & Prevent. Med.* 1913. Sept. Vol. 1. No. 3. p.p. 228-245.

This interesting paper gives a very complete resumé of the work that

has been done on the subject since WRIGHT'S observations in 1895. The author points out that the disease is now definitely recognised as being present in Texas, and believes that it is much more widely spread in America. No new facts are brought forward, but in his conclusions the author states that the accumulated experiences of the past decade in the use of bacterial vaccines in general prove that, properly used, suspensions of killed micrococci have marked value, and possibly there may be an advantage in the use of sensitized vaccines for the treatment of persons of low vitality, or at a toxic period of the disease. [This has not yet been tried in undulant fever.] Anti-melitensis serums had practically been abandoned until the introduction of Trambusti-Donzello's serum, which is stated to have given satisfactory results when used early in the cases. A bibliography is given at the end of the paper.

P. W. B.-S.

IZAR (Guido). **Sulla Chemoterapia del l'Infezione Melitense.**—*Pathologica.* 1913. Nov. 15. Vol. 5. No. 121. pp. 672-676.

After a preliminary discussion of chemotherapy the author states that melitensis infections should be very amenable to chemical agencies. He therefore carried out some experiments in vitro and in vivo. Ethyl copper chloride, Isopropyl copper chloride, and Isoamyl copper chloride were used, successive dilutions of the salts were made and these were then mixed with a seven days broth culture of *M. melitensis*. The former salt was the most powerful, killing the micro-organism in dilution of 1/128,000; this was, therefore, used for the experiments. Tests as to effect of time and temperature were made and also the action of the salt on cholera and coliform organisms. For further experiments, white rats and mice were used; these were infected intraperitoneally with the micro-organism, and the salt was given subcutaneously in a 2 per cent. solution in oil. In the first series, both with a single dose and with four repeated doses, the animals remained well after 240 hours, the controls dying in 72–84 hours. Similar results were obtained when both the dose of the infecting organism and the salt were increased. A third series showed that the treatment was effective when the salt was given as long as 60 hours after the infection, but after 72 hours the animals died in the same time as the controls. [These results confirm the work of SCORDO (this *Bulletin*, Vol. 1, p. 578), which showed that chemical agents injected into the blood of animals do frequently destroy the rather sensitive micro-organism of undulant fever. It is unfortunate that the author uses the formula of M.Br. for *Micrococcus melitensis* of BRUCE, as NICOLLE introduced the formula M.M.Br. for the strain now known as *M. para-melitensis*.]

P. W. B.-S.

THE WHITE RACE & THE TROPICS.

i. Price (G. Basil). **Discussion on the Causes of Invaliding from the Tropics.**—*Brit. Med. Jl.* 1913. Nov. 15. pp. 1290-1293.

ii. Simpson (R. J. S.). *Ibid.* pp. 1293-1294.

iii. Law (William F.). *Ibid.* pp. 1294-1296.

i. The author starts his paper by saying that considerable variation may be expected to occur amongst those resident in tropical and sub-tropical regions, both in the different countries concerned and amongst the different classes of European residents. Some factors relating to health and disease are fairly constant, such being average temperature, thermic influence, the humidity of the atmosphere, elevation, different diseases and insanitary conditions. Others again vary greatly, for example, the location of the individual, his habits, and idiosyncrasy. The figures from which the author's statistics were derived refer to missionaries, 1,479 lives being dealt with, of which 1,051 were obtained from the Church Missionary Society.

India.—The following table gives the different causes of invaliding taken from 203 cases living in India :—

	Per cent.	
Nervous conditions of a neurasthenic type	20·6	25·4
Mental disorder of acute type	4·8	
Enteric fever	16·6	
Malaria	13·3	
Dysentery	6·4	
General debility	4·8	
Pulmonary tuberculosis	3·2	
Cardiac disease	3·2	
Anaemia	3·2	
Small-pox	1·6	
Gall stones	1·2	
Eye conditions	1·2	
Blackwater fever	0·8	

China.—In this country the missionary lives numbered 394 (162 men and 232 women) and supplied 203 cases of invaliding.

Causes.	North (58 cases)	Central & West (79 cases)	South (66 cases)	Total (203 cases)
	Per cent.	Per cent.	Per cent.	Per cent.
Neurasthenia	44·8	17·7	16·6	25·0
Insanity	5·1	12·6	7·5	8·8
Enteric and para-typhoid	13·8	7·6	7·5	9·8
Malaria	8·6	11·4	15·0	11·8
Dysentery	5·1	7·6	3·0	5·9
Tubercle, pulmonary	5·1	8·8	18·0	10·8
Typhus	—	5·0	—	1·9
Sprue	—	2·5	4.5	2·9
Small-pox	—	3·8	—	1·4
Anaemia	—	—	3.0	0·9

Africa.—134 persons were invalided from different parts of Africa, the following being the diseases responsible :—

Causes.	North (39 cases)	West (12 cases)	Central (52 cases)	South (31 cases)	Total (134 cases)
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Neurasthenia ..	23·0	8·3	21·1	22·5	20·8
Malaria	10·0	75·0	19·2	9·6	19·4 / 29·1
Blackwater fever ..	2·5	—	21·2	3·2	9·7 /
Enteric	18·0	—	—	12·9	8·2
Dysentery	10·0	—	1·9	—	3·7
Small-pox	2·5	—	1·9	—	1·5
Cholera	2·5	—	—	—	0·7
Undulant fever ..	2·5	—	—	—	0·7
Anaemia	—	8·3	9·6	—	4·4
Pulmonary tuberculosis	—	—	—	12·9	3·0
Old Age	—	—	—	25·8	6·0
Typhus	—	—	—	3·2	0·7
Tick fever	—	—	1·9	—	0·7
Sleeping Sickness ..	—	—	1·9	—	0·7
Mania	—	—	3·8	—	1·5
Heart Disease ..	—	—	—	6·4	1·5

From his work the author reaches the following conclusions :—

"1. That a missionary's work involves great risks to health.

"2. That capacity for 'nerve strain' is a real factor to be considered in passing candidates to go abroad, and therefore it would be wise to exclude those who have any decided taint of mental instability in their family history, also those of highly nervous temperaments. The impulsive, enthusiastic, but easily depressed person will not stand the strain of the conditions inseparable from a tropical life and work, unless they have also a leaven of common-sense, humour, and good self-control. Isolation, overwork, under-staffing of stations, the heavy incidence of minor illness which does not immediately necessitate invaliding, the possible experience of scenes of violence and alarm (especially during recent years in China), will try the most placid or callous temperament, and largely accounts for the heavy incidence of this class of disease—that is, 20 to 80 per cent. of invaliding.

"3. The prominence of a large class of infectious diseases calls for note, since an average of 42 per cent. of invaliding is due to them. Against this latter class many safeguards can be taken ; small-pox should never occur if revaccinations were enforced. Enteric fever should be greatly diminished with wider and more frequent recourse to inoculation and extended knowledge as to methods of infection amongst the laity.

"Malaria and blackwater fever can be more nearly controlled if more persistent efforts were made to efficiently teach all who go abroad the facts so universally acknowledged as to malarial prevention. Referring to the section I represent, many societies do not even yet see the necessity for any systematic instruction on health and hygiene for their missionaries, whilst they insist on a too long course (as it seems to the writer) in theological studies, if health and life have to be sacrificed for it.

"4. The frequent appearance of pulmonary tubercle—due generally to infection abroad—points to the necessity for eliminating by medical examination all those who may from their family or personal history have shown predisposition to the disease.

"5. Most of the lives considered in the above statistics are select lives, the examinations by many of the societies being as strict as for a large insurance policy, but the need for such medical criticism and elimination of the unfit still needs emphasizing to certain other societies and associations."

ii. The materials used for Colonel Simpson's paper were taken from the Army Medical Reports from 1886 to 1895, 1896 to 1905, and 1906 to 1910. The numbers invalided per 1,000 of strength over each of these periods have been compared. In India between 1907 and 1911, both inclusive, the following were the actual numbers of cases invalided permanently for tropical disease :—

Enteric fever	21
Kala Azar	3
Beriberi	4
Malaria	18
Dysentery	1

or a total of 47 cases in five years on an average strength of about 72,000 men.

Among non-tropical diseases nervous and mental diseases predominate, epilepsy, melancholia and delusional insanity being common. The author concludes :—

"(1) That Tropical diseases of themselves produce only a relatively large temporary invaliding.

"(2) The temporary invaliding from a station for causes other than tropical disease, taken generally, rises and falls over the whole of our foreign stations with the invaliding for tropical disease.

"(3) The important causes of invaliding, temporary and final, are in order of importance :—

Nervous and mental diseases.
Tuberculous disease.
Diseases of the special senses, including the eye.
Diseases of the heart, functional and organic.

"(4) These are the same causes which are effective in Great Britain and almost in the same order."

iii. The observations set forth in this paper were based upon the work done in British Guiana, which was confined to no particular class but included Government officials, employees on sugar plantations and business men and their families. The author believes that, even if all tropical diseases were eliminated, climate would still remain a powerful enemy to the settlement of the European in tropical countries. Apart from climate, by far the most fertile source of invaliding in British Guiana is malaria, which accounts for nearly three-quarters of the temporary invaliding, and is an important element in bringing about permanent disability. Nervous disease, as the most frequent cause of prolonged and permanent invaliding, comes next to malaria. Of these, functional derangements, varying from mere nervous irritability or slight mental depression to acute melancholia with suicidal tendency, are common. Heavy work of a responsible nature is not easily borne in the trying conditions of tropical life and this frequently leads to the so-called nervous breakdown.

Epitomizing his conclusions the author states :—

"It would appear that permanent invaliding is most frequently demanded in cases of nervous disease, heart affections, and obstinate anaemias ; whereas temporary invaliding, if of sufficient duration, will as a rule, set right an otherwise healthy person suffering from malaria, enteric fever, dysentery, or other acute disease."

Other speakers who joined in the discussion also laid stress upon the frequency of neurasthenia in Europeans living in the Tropics. [The frequency of this amongst missionaries is well brought out by Dr. PRICE's tables.]

G. C. Low.

CHARLES (Havelock R.). **Neurasthenia and its bearing on the Decay of Northern Peoples in India.**—*Trans. of the Soc. Trop. Med. & Hyg.* 1913. Nov. Vol. 7. No. 1. pp. 1-31.

The author states that an abnormal bodily state is produced by the light, humidity and heat of the Tropics—a change in body temperature, a lowered pulse rate and tension, an irritable heart, a lessened respiratory function, owing to deficiency of intake and rarefaction of the air, and deterioration of the blood. An increasing perspiration causes a lessening of the kidney excretion and with the extra work thrown on the liver there follows a continued congestion, then degeneration. Thus the climatic conditions lower the powers of resistence and render the individual more liable to fall a victim to the attacks of the specific forms of disease.

Light coloured persons are perfectly fitted to cold climates, but when they migrate to hot latitudes they are damaged by the conditions to which they are exposed. This, the author states, accounts for the fact that though there has been a succession of streams of white races flowing south into India, these people have not permanently survived there as such. Those that have remained have become absorbed and have taken on the characteristics of the country. Many others have disappeared and are forgotten. For a white race to preserve its purity and predominence in a tropical climate and to keep that vigour, intelligence, and physique which are its characteristics, fresh waves of immigration are essential to make up for the wear and tear due to climatic influences. To those who say that white races can permanently colonize the tropics the author brings forward the history of the various multitudes of invaders of India, their utter disappearance or their absolute changes, both bodily and mental.

In the discussion which followed the reading of the paper BALFOUR quoted some suggestions from ANDERSON'S "White Man in the Tropics," and as these are important and sum up the subject in a nutshell they may be given here :—

"1. When a species is well adapted to the conditions which environ it, it flourishes ; when imperfectly adapted, it decays ; when ill adapted, it becomes extinct.

"2. When a white man, native of a temperate zone, goes to the tropics, there occurs a histological reaction of his system to the new environment, and readjustments of co-ordination between his vital processes.

"3. In the tropics the white man, individually, can exist ; racially, he cannot persist.

"4. Acclimatisation is not possible.....

"No colony of northern origin has ever been able to lead a permanent and independent existence in the tropics."

[From the remarks of other speakers, as well as those quoted above, it is readily seen that nervous disorders, usually spoken of as neurasthenia, are the chief causes of the degeneration of the white man in the tropics. See also papers above by PRICE, SIMPSON and LAW. How far this condition is a result of previous tropical illnesses, such as malaria, dysentery, etc., is not pointed out, but clearly this is important and requires careful consideration.]

G. C. L.

GUITERAS (Juan). **The White Race and the Tropics.**—*Amer. Jl. Trop. Dis. & Preventive Med.*—1913. Aug. Vol. 1. No. 2. pp. 152-168.

Arguments are presented in support of the view that the tropical climate is compatible with the best manifestations of human activity and that the acclimatisation of the white race has, in the Tropics, been successfully accomplished. The author believes that many of the failures of the white races successfully to acclimatise in the Tropics have been chiefly due to diseases such as ankylostomiasis, malaria, etc. A table of vital statistics of Cuba is given, and the author argues that the results contained therein do not represent the death rate of a dying population, but rather of one that is very much alive. The general death rate reaches a very low figure, and one that compares favourably with those of the best organised countries in other latitudes. It is noted that as regards modes of living the Spaniard and Englishman have markedly differed, though those differences are perhaps not as striking to-day as formerly. The Spanish conquerors, according to the author, displayed in the Tropical countries of America, often in the low and hot lands, a degree of energy which they never equalled in their European struggles and achievements. Physiologists and hygienists have not been able to point out any alteration in the metabolic processes of the human body in the Tropics, adaptations of the heat-eliminating functions of the skin having alone been observed.

Guiteras believes, however, that proper motives and proper channels of energy are generally lacking or misdirected at the present time in the white communities of the Tropics, though those communities are now beginning to conquer the diseases that have contributed to place them, for the time being, on a scale of relative inferiority.

G. C. L.

CHAMBERLAIN (W. P.). **Some Features of the Physiologic Activity of Americans in the Philippines.**—*Amer. Jl. Trop. Diseases & Preventive Med.* 1913. July. Vol. 1. No. 1. pp. 12-29.

The influence of warm climates on Caucasians from temperate zones, who take up their residence for longer or shorter periods in the tropics, is a matter of great and increasing importance. In the past the effects of climate *per se* have been largely masked by the results of varying tropical diseases, but now that these can be largely prevented the former condition may be studied in a pure state. Chamberlain has done this, selecting for his purpose the men in the military forces of the United States who have served in the Philippines during the last few years—these men of course are specially selected, being perfectly healthy when they go to the tropics and, when there, given every hygienic protection. He summarises his conclusions as follows :—

1. Healthy American males, averaging about 25 years of age, after 19 months' residence in the Philippines, show :—

(*a*) An average body temperature by mouth of 98·7° F.

(*b*) An average pulse rate of 77·3 beats per minute.

(*c*) An average respiration rate of 19·3 per minute.

(*d*) An average systolic blood-pressure of 115·6 millimeters.

(*e*) An average loss of weight during one year of two pounds, or 1·3 per cent.

(*f*) No greater per cent. of loss for large men than for small men.
(*g*) An average erythrocyte count of 5,200,000 per cubic millimeter.
(*h*) An average haemoglobin reading of 89·6 per cent.
(*i*) An average leucocyte count of 7,304 per cubic millimeter.
(*j*) An average polymorphonuclear count of 56·8 per cent. with small lymphocytes 31·7 per cent. and large lymphocytes 6·9 per cent.
(*k*) A very slight shift to the left in the Arneth picture.
(*l*) An average specific gravity of urine of 1019·8.
(*m*) No appreciable effect on items (*a*) to (*i*) as a result of complexion, type or season.
(*n*) A very slight increase in temperature and respiration rate, a moderate increase in pulse rate, and a considerable elevation of blood-pressure as a result of moderate exercise.

2. There is no material difference in the admission rates for insanity and nervous diseases, and in the ratio of suicides, for troops serving in the Philippines and for those stationed in the United States.

3. Among 1,208 men residing in the Philippines :
(*a*) Seventeen per cent. complain of some loss of memory.
(*b*) Six per cent. complain of insomnia.
(*c*) Twenty-five per cent. complain of depression.
(*d*) Six per cent. complain of irritability.
(*e*) Six per cent. complain of anorexia.
(*f*) Eighty-seven per cent. eat as much as at home, three per cent. more and ten per cent. less.

Since all men were doing full duty, it is probable that the sensations complained of were of slight degree and perhaps in many cases fanciful.

4. It seems probable that climate *per se* exercises little if any harmful influence on Americans in the Philippines.

5. By far the larger part of the morbidity and mortality in the Philippines is due to nostalgia, isolation, tedium, venereal disease, alcoholic excess, and especially to infections with various parasites.

6. The facts justify the hope that the progress of tropical sanitation may ultimately permit the permanent colonization of certain parts of the tropics.

[Loss of memory, insomnia, depression, anorexia, irritability, etc. must be put down to the climate *per se* i.e., to its harmful effects, and it is just these causes that render a very prolonged life in the tropics an impossible one for many Europeans.]

G. C. L.

MISCELLANEOUS.

Külz (L.). **Beiträge zur Pathologie Kameruns.** [Contributions to the Pathology of Kamerun.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 830-834. With 2 text figs.

Several peculiar pathological conditions are described. The first condition, [though the author does not suggest this,] is evidently ulcerating granuloma of the pudenda; from the photograph in the text it would seem to be a typical case.

The second, again illustrated by a photograph, shows a mycotic condition of the skin, microscopic specimens showing a network of fine mycelial threads. [Could it be pinta ?]

Thirdly a case of *Hautmaulwurf* [Creeping disease] is described, fourthly another peculiar dermatitis, fifthly cases of non-leishmanial tropical splenomegaly—so called pseudo-kala azar [such cases have been described from the Philippine Islands and from Egypt, while the reviewer has seen similar ones from the West Coast of Africa], and lastly a febrile condition with recurrences with no spirochaetes present in the blood during the remissions.

G. C. L.

JAMAICA. **Six-Monthly Report on the Work of the Governmen Bacteriologist, March to September, 1913.** [SCOTT, H. H. —Received in Colonial Office, Nov. 6, 1913.

Ankylostomiasis.—During the year ending March 1913, over 800 specimens of faeces were examined from various districts of the island and 78·2 per cent. were found to contain ankylostome ova. In addition Trichuris and Ascaris ova were found. The following method for examining faeces was adopted: A portion of the faeces was well shaken up with water in a specimen tube (unless the stool was fluid), the resultant emulsion was then centrifuged and slides of the deposit put up, a cover-glass was applied and the specimen examined. If the result was negative, a second and third slide were examined. It was not possible to look at more than three, for on some days as many as 50 specimens or more had to be examined in addition to other work. If the calcium chloride method had been employed, it is possible that a slightly higher percentage of positive findings would have resulted.

The author believes that invasion by these parasites is responsible for the natural dullness, indolence and "ergophobia" of the native. Many of these suffering with indefinite symptoms such as fatigue on mild exertion, slight fever, want of concentration, and general hebetude, were found to be harbouring ankylostomes.

Dysentery.—During the period under review there has been more dysentery than usual in the Island. The disease has not been limited to any particular district and though many cases have occurred there has been no actual epidemic. Amoebic, bacillary, lamblial and balantidial forms have been met with in the order given. The opinion was formerly held that amoebic dysentery was not seen in Jamaicans, the main reason for this statement being that liver abscess is very rare there. The author points out that this condition is probably not so uncommon as is generally believed.

Three cases of blackwater fever came under notice, but nothing peculiar was found in the blood.

[The statement that a case of filariasis has never been seen in a Jamaican unless he has been abroad requires confirmation. A more extended and accurate examination of cases would probably show that the disease does exist there though it may not be as abundant as in Barbados and the other West Indian Islands.]

G. C. L.

CHAGAS (C.). **Notas sobra a Epidemiologia do Amazonas.** [Notes on the Epidemiology of the Amazons.]—*Brazil Medico.* 1913. Nov. 8. Vol. 27. No. 42. pp. 450-456.

In this paper the author gives a very comprehensive account of the diseases met with in the Amazon basin, during a professional tour made in that region on behalf of the Oswaldo Cruz Institute.

The Amazon basin is chiefly given up to the collecting of rubber, and the health of the rubber-collecting population is a matter of immense commercial importance to Brazil at the present time, in view of the competition of other rubber producing localities. The author was sent to report upon this subject.

The mortality from malaria in the valley of the Amazon is enormous.

The case is given of a small town named San Felippe on the Rio Juruá, in which out of a population of about 900 inhabitants 400 died of malaria alone in the first six months of 1911, according to official statistics. The general neglect of the use of quinine as a prophylactic in these regions is remarkable. In the municipal pharmacy of San Felippe was found only one small bottle of quinine, containing 20 grammes, thrown into a corner along with other unused drugs. This prejudice is traceable to the fact that, in former times when quinine was dear, the rubber-stations along the rivers were visited by itinerant medical practitioners who came by boat and vended the drug at a high price in totally inadequate doses. As the author points out, such a use of quinine makes the parasites more resistant and so the remedy is discredited. The malaria of the Amazon basin seems to be due to three types of parasite, of which the benign and the pernicious tertian are by far the most frequent. The quartan form was only met with on the Rio Acre, where it causes a type of disease remarkable for the early supervention of oedema of the ankles and of the body generally. As the parasites are found to be very plentiful in the blood of this type of ague, the dropsy would seem to be due to the destruction of blood corpuscles. This form of oedema often gives rise to the diagnosis of beriberi, generally supposed to be a common disease on the Amazon. The author however thinks that such a diagnosis is generally erroneous, and the same may be said of malarial polyneuritis, of which he did not meet with a single genuine case. The anopheline mosquitoes of the Amazon are of three species only, *Cellia albimana*, *C. argyrotarsis*, and *Stethomyia nimba*.

Leishmaniasis is a common and important disease in the Amazon basin. It goes by various names, chiefly that of *feridas bravas*, or angry sores. In the hospitals of Manaos numerous cases were seen. A common form, often mistaken for syphilis, is an ulceration of the nares which often extends to the mouth and throat. The disease shows no tendency to spontaneous cure. The most efficient treatment is by local injections of tartar emetic [details not given] as practised by Dr. Gaspar Vianna. Another curious affection seen amongst the Indians on the river Purus is *purú-purú*, signifying "spotted." It is characterized by black spots on the skin, surrounded by whitish areas due to disappearance of pigment. The cause has not been determined with certainty. Ankylostomiasis is a trouble in mining regions on the Rio Negro, and leprosy and yaws are also met with.

Amongst animal diseases mal de caderas takes a principal place, and the consequent mortality amongst mules is a serious inconvenience where rubber has to be transported on mule-back. In such localities the price of a mule may be nearly a million reis (about £100). The author considers the capybara to be the host of the parasite, because he came across the bodies of a large number of these animals, in places where the disease was causing considerable damage at the time among the equines.

He concludes with some emphatic remarks on the economical necessity for bettering the sanitary conditions of this immense tract of country.

J. B. Nias.

Otis (Elmer F.). **Diseases of Porto Rico.**—*Jl. Amer. Med. Assoc.* 1913. Sept. 27. Vol. 61. No. 13. pp. 1031-1034. With 1 chart.

A short account of some of the diseases found in Porto Rico. Tuberculosis, typhoid and malaria may justly, the author states, receive first mention, while rickets, bronchopneumonia, angina pectoris, venereal diseases, tumours, meningitis and a variety of chronic rheumatic infections are not unfrequently met with. As regards tropical diseases ankylostomiasis, as is well known, is common, while lately it has been shown that sprue is more frequent than was previously supposed. Epidemics have from time to time prevailed. Yellow fever, however, has never appeared on the island since the American occupation. Cholera once visited it in 1845 and a small epidemic of plague in 1912. This was quickly subdued, a specially vigorous campaign against rats being adopted.

G. C. L.

Deeks (W. E.) & Baetz (W. G.). **An Analysis of Five Hundred Fatal Medical Cases in the Tropics.**—*New York Med. Jl.* 1913. Aug. 30. Vol. 98. No. 9. pp. 401-407 & Sept. 6. No. 10. pp. 462-465.

Five hundred fatal medical cases in the Panama Canal Zone are analysed. The aim of the authors has been to ascertain primarily the errors made by the medical staff of the Ancon Hospital in determining the actual cause of death among a population in the Tropics where the negro and mulatto outnumber the white in a ratio of about six to one. Without autopsy, they say, the cause of death is correct in only some 80 per cent. of the cases; with autopsy findings, in something over 96 per cent. The great majority of failures to diagnose clinically is due, according to the authors, to neglect of some elementary routine examination, either physical or laboratory.

[The analysis brings out strikingly how common ordinary diseases, such as tubercle, act as a cause of death in the Tropics.]

G. C. L.

Maxwell (James L.). **Some Diseases, the Parasitic Causes of which are Obscure.**—*China Med. Jl.* 1913. Sept. Vol. 27. No. 5. pp. 279-285.

Febrile tropical splenomegaly, fistulous disease of the buttocks, and rat-bite disease are discussed.

Reports from Ichang, Soochow, Weihsien, Wuhu and Formosa indicate that enlargement of the spleen associated with ascites, not due to *Schistosoma japonicum*, kala azar, or other well known causes is prevalent. Wooley in the Philippines has also described such cases, as have authors in Egypt and elsewhere. The disease, as Maxwell himself has observed it, has the following symptoms:—

"1. An insidious onset. Probably some irregular fever is always an early symptom.

"2. Enlargement of the spleen; always considerable, sometimes enormous.

"3. Cirrhosis of the liver, in early cases hypertrophic, in late cases usually atrophic. It is probable that the enlargement of the spleen is always primary to that of the liver.

"4. Anaemia, a roughly proportionate decrease of all the cellular elements of the blood, with a slight relative lymphocytosis.

"5. Periodic attacks of irregular fever.

"6. In the late stages ascites, often extreme, with some not very well marked general anasarca towards the close.

"7. A tendency to progress to a fatal termination, though in the early stages of the disease there may be intermissions of considerable length.

"8. More rarely, and this especially in young subjects, the disease appears to run an acute course, terminating fatally in a year or more.

"9. The disease is found at all ages and in both sexes, but is particularly an affection of the prime of life."

No organisms resembling leishmania have been seen in any of the cases. [See also this *Bulletin*, Vol. 1, pp. 112–113.]

As regards fistulous disease of the buttocks, this is rare, the author seeing only two cases or so a year in an in-patient clinic of 2,700, and an out-patient clinic of twice that number.

So far all the cases have occurred in adult males, the patients coming with the statement that the disease began from a year to several years previously with an ordinary fistula-in-ano. On examination one or both buttocks are found to be riddled with sinuses forming a veritable mass of passages under the skin of the part, each frequently being marked on the surface by massive induration of the skin and subcutaneous tissues. Small openings, where the skin has given way, are to be seen and these exude a serous pus. The disease is almost painless but gives rise to considerable discomfort in sitting. As regards pathology, this is chiefly negative. It is not syphilitic or at least it fails entirely to react to anti-syphilitic treatment. It is not tuberculous and so far as the author has been able to discover is not mycotic. [See also this *Bulletin*, Vol. 1, p. 456. The presence of entamoebae noted by the author in some of the cases can hardly be recognised as causative.]

Rat bite disease has been seen on a few occasions, the course followed in these cases being very similar to that described by SCHEUBE and others. In one case, however, that of a Chinaman, there was the following peculiar history. The patient had been bitten some days before by a rat on the right hand. The wound was dressed at once, but a lymphangitis followed and, when the patient was seen, definite hard and painful lumps were felt in the lymphatics of the arm with red patches in other places of the body. The axillary glands were little enlarged. The case suggested at once one of sporotrichosis, and potassium iodide rapidly reduced the size of the lumps. The patient left the hospital before being completely cured but returned again shortly after with a recurrence of the trouble. A further course of potassium iodide completely cured him. The author thinks, therefore, that the case may have been one simply of sporotrichosis but, if so, he considers that the germ was inoculated by the bite of the rat. He suggests further investigations on the subject.

G. C. L.

BREINL (Anton). **Two Cases of "Climatic Bubo."**—*Australian Inst. of Trop. Med. Report for the Year* 1911. pp. 27-29.

Two cases of climatic bubo, clinically very similar and with the same history, were admitted to the Townsville Hospital. The first was a labourer 28 years of age. He had been working previously for years in different parts of North Queensland. Three weeks before

his admission to the hospital he noticed swellings in both groins, which became very painful on pressure, the pain increasing when he walked about. As the swellings did not disappear after various applications, the patient sought admission to the hospital.

In both groins one gland of the size of a hen's egg could be felt, besides lymph glands of the size of a pigeon's egg. Over the larger lymph glands fluctuation could be made out. The body temperature was only slightly raised; it never surpassed 99·8° F., being slightly higher in the evening than in the morning.

Neither the examination nor the history of the case revealed anything which might have accounted for the swelling of the lymph glands.

The large lymph glands on both sides were removed. On cross section these offered a similar microscopic appearance. The surrounding connective tissue capsule was much thickened, and the lymph gland was intersected by a well developed frame-work of fibrous tissue. All through the surface layers of the gland haemorrhagic infiltration was noticed, extending into the central parts. Here and there were smaller or larger irregular areas, showing suppuration, some of these containing liquid pus, while others showed only softening of the lymph tissue. Some of the smaller lymph glands which were extirpated at the same time were microscopically of normal appearance.

The other case was of a similar nature. With the exception of *Staphylococcus albus*—evidently a skin contamination—no bacteria grew on the different culture media. This finding, together with the histological features of the glands, shows according to the author, beyond doubt, that the clinical diagnosis, climatic bubo, was correct and that this disease does occur in Northern Queensland although rare.

G. C. L.

ZIEMANN (H.). **Zur Therapie der Menstruationsbeschwerden der Frauen in den Tropen.** [On the Therapy of painful Menstruation in the Tropics.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. July. Vol. 17. No. 13. P. 459.

Menstruation in white women in the tropics is more difficult than at home. The author advises the use of a drug named "Eumenol." This substance is derived from the root of a well known Chinese plant named "Tangkuive," variously described as belonging to the Natural orders *Araliaceae* or *Umbelliferae*. The tincture is a useful form to adminster it in, this being bitter and aromatic, or it may also be put up in dried tablets of 0·3 grammes. It is said to be specially useful in nervous dysmenorrhoea.

G. C. L.

HADWEN (Seymour). **On "Tick Paralysis" in Sheep and Man following Bites of** *Dermacentor venustus*.—*Parasitology.* 1913. Oct. Vol. 6. No. 3. pp. 283-297. With 2 plates.

The author shows that tick paralysis is found in sheep and probably other animals in British Columbia as well as in man. [For its occurrence in man see this *Bulletin*, Vol. 2, p. 204.] The tick implicated is the *Dermacentor venustus*, Banks. The disease is usually of short duration, and is benign in character, but occasionally persists

for long periods and may terminate fatally. The symptoms in lambs develop gradually, the first noticeable being restlessness, the animals at times struggling about and bumping against obstacles. Later on they fall down and cannot rise, and at this stage they struggle a great deal. As paralysis advances they cease struggling but still have a wild eyed look. After recovery begins, attempts are made from time to time to rise and these continue until they are able to stand, after which recovery is very rapid. The causative agent has not been discovered and the disease has not been reproduced by inoculation. The most likely hypothesis is that the tick injects a toxin which gives rise to symptoms appearing coincidently with its complete engorgement. In three consecutive cases experimentally produced by the author in lambs, paralysis occurred six to seven days after the ticks were put on. In sheep the bite of the tick is usually along the backbone and possibly the point of attachment may have some bearing on the symptoms and severity of the case. Whether other species of ticks may produce similar diseases is not so far known.

G. C. L.

Hadwen (Seymour) & Nuttall (G. H. F.). **Experimental "Tick Paralysis" in the Dog.**—*Parasitology.* 1913. Oct. Vol. 6. No. 3. pp. 298-301.

A positive experiment carried out in Cambridge upon a dog experimentally infested with a single *Dermacentor venustus* obtained from Canada is recorded. The symptoms were similar to those observed in sheep in British Columbia by Hadwen. [See above.] An examination of the dog's blood showed no parasites of any sort and inoculations into other animals proved negative. The authors discuss the question of the symptoms being due to a toxin or to infective germs and hope, in the course of further investigations, to throw more light upon this interesting affection.

G. C. L.

Cooley (R. A.). **Notes on Little Known Habits of the Rocky Mountain Spotted Fever Tick** (*Dermacentor venustus*, Banks).—*Jl. Economic Entomology.* 1913. Feb. Vol. 6. No. 1. pp. 93-96.

During investigations of the Rocky Mountain spotted fever tick (*Dermacentor venustus* Banks) in the Bitter Root Valley, Montana, in co-operation with the Bureau of Entomology, interesting observations have been made on the waiting habits of this species. In numerous instances in nature, and in out of door conditions which very closely resemble nature, adults of this tick have been found in a definite "waiting attitude," which the author regards as habitual. A dead, bare, upright twig, or grass stem, is usually selected and, with the capitulum directed downward, the support is firmly grasped with the third pair of legs, these legs serving as the only means of attachment while the first, second and fourth pairs are extended and waved, in reaching for animals which approach. Prepared in this manner, it is easy for the tick when a suitable host appears to attach itself to it.

G. C. L.

FRICKS (L. D.). **Rocky Mountain Spotted (or Tick) Fever. Sheep Grazing as a Possible Means of Controlling the Wood Tick (*Dermacentor andersoni*) in the Bitter Root Valley.**—*U.S. Public Health Rep.* 1913. Aug. 8. Vol. 28. No. 32. pp. 1647-1653.

The author states that since the discovery that Rocky Mountain spotted fever is transmitted by the bite of the wood tick, *Dermacentor andersoni* (=*D. venustus* Banks) different measures have been proposed for its eradication. These, summarised, are as follows :—(1.) Clearing and cultivation of tillable land. (2.) Burning over foothills and "slashings." (3.) Killing of the small wild mammals. (4.) Dipping of domestic animals in arsenical dip. (5.) Spraying and removing ticks by hand from domestic animals.

Each of these is useful in its way and possibly might if judiciously employed over a suitable and limited territory eventually eliminate the tick infection. Nevertheless all these methods have been attempted on the west side of the Bitter Root Valley for three years or more without greatly diminishing the number of ticks to be found or the number of deaths from spotted fever. The author therefore carried out a series of experiments on sheep grazing as a possible means of controlling the tick. A description of these is given. In his summary on these experiments the author states that :—(1.) Over 87 per cent. of 295 ticks placed in the wool of unshorn sheep were recovered dead. (2.) The majority of the ticks recovered from sheep grazing naturally over tick-infested territory were found dead. (3.) Many of the engorged females recovered appeared not to have been fertilized. (4.) Comparatively few ticks, either alive or dead, were found on the sheep after they had been sheared.

He believes therefore that these findings warrant the continuation of the experiment by the placing of a herd of 2,000 wethers on some selected range west of the Bitter Root River as early in the spring as possible. The selected range should be closely grazed until shearing time, and then, if desired, the sheep could be sheared, dipped, and transferred to the east side of the valley without danger of carrying wood ticks, or returned immediately to the range until the experiment is completed.

Four factors are to be considered in the sheep-grazing experiments :—(1.) The removal of undergrowth and the consequent destruction of "good tick country" by close grazing. (2.) The destruction or removal of other large mammals, domestic and wild, from the sheep range. (3.) The destruction of ticks themselves by the grazing sheep. (4.) The placing of the problem of tick eradication on an industrial basis.

If this can be done, the author believes that the problem might solve itself and the danger from Rocky Mountain spotted fever, which has hung like a blight over the eastern slopes of the Bitter Root Valley for 30 years or more, might possibly be abolished. G. C. L.

ZIEMANN (H.). **Zur Pathogenese, Diagnose und Prophylaxe der Tuberkulose in den Tropen.** [Pathogenesis, Diagnosis and Prophylaxis of Tuberculosis in the Tropics.]—*Centralbl. f. Bakt.* 1 Abt., Orig. 1913. Aug. 4. Vol. 70. No. 3/4. pp. 118-141.

The author reviews the published data on tuberculosis amongst native races throughout the world. He gives in some detail the history

of Kamerun in this respect—at the beginning of the century the disease was not found—and the results obtained by him with von Pirquet's reaction, carried out on Bantus, Hottentots from South-West Africa, Hausas and Syrians in that country. His conclusions are to the following effect:—

Tuberculosis amongst native races has made considerable progress, varying in different districts. In places where no immunity has been produced in consequence of long presence of the disease it tends to be acute. The liability of natives is increased if they are herded in close association with Europeans, giving up their old habits and living in less good conditions, especially in the case of the negro owing to his strong disposition to catarrhal affections of the air ways.

The spread of the disease is favoured by trading foreigners; in East Africa by Indians, in West Africa by the Syrian; to some extent also by the Hausa, but in Ziemann's experience, only slightly by the European, who has already been medically examined in Europe.

For native populations the ophthalmic reaction is less suitable for diagnosis than v. Pirquet's cutaneous reaction, on account of the proneness of the negro to episcleritis.

Corresponding to the small incidence of tuberculosis amongst the negroes in Kamerun—a number of tribes appear to be still quite free—there is an almost complete absence of tuberculosis of cattle in Central Africa. Owing to the great danger of tuberculosis getting a further hold on the natives, and seeing how difficult it is to fight it in the tropics, Ziemann makes the following strong recommendations:—

1. The Europeans sent out should be healthy and have been found to be free from tuberculosis at a previous examination. Every case of open tuberculosis should be treated at once and sent back as soon as possible if there are facilities for transport. Naturally Europeans would not be sent home in the winter.

2. The European and native populations should receive instructions on the nature and prevention of tuberculosis.

3. Every case diagnosed in the natives should be notified to the authorities and kept under observation and treatment. There should be very strict sanitary supervision of all natives who are employed in trade for Europeans, and diagnostic tuberculin reactions should be used on them.

4. The standard of housing, dressing, and living should be raised amongst the natives. Tuberculosis in Africa like malaria is chiefly a disease of want of civilisation (*Unkultur*).

5. Persons passing the boundaries of a colony or foreigners present in it should be subject to strict supervision; for instance Hausas, Syrians, Indians, etc., and all foreigners who are not certainly healthy should be turned back. This recommendation is also useful for the combating of other disease, such as sleeping sickness, and with good-will can be easily carried out.

6. General progress in the same direction of all nations possessed of colonies in Africa.

7. Increase of the sanitary personnel in the whole of Tropical Africa.

8. More careful examination of flesh, and veterinary supervision of herds.

A. G. B.

Book Reviews.

East Africa Protectorate. **i. Nairobi Laboratory Reports for Half-year January-June 1912.** Vol. 3. Pt. 1. By R. Small [Acting-Govt. Bacteriologist] and V. H. Kirkham.—73 pp. 4to. 1913. Printed by Waterlow & Sons, Ltd., London. **ii. Nairobi Laboratory Report for the months July-December 1912.** Vol. 3. Pt. 2. By Philip H. Ross [Govt. Bacteriologist] and V. H. Kirkham, Govt. Analyst. v. 72 pp. 4to.

These two volumes contain the reports of the Nairobi Laboratory and of the Government Analyst for 1912. Part 1 deals with plague, leprosy, trypanosomiasis, and spirochaetosis, and includes an investigation of an alleged outbreak of plague amongst the Laitokotoh Masai. A disease known by the natives as "Ngawavi" has been described amongst these people. It is a fatal disease of five or six days' duration, and is distinguished by painful glandular swellings. A careful examination of six cases by Small revealed the fact that they were really malignant malaria. The conclusions arrived at, however, were that a plague-like disease did exist in the hills in an endemic form, but that the native name "Ngawavi" is apt to be used for any grave illness. Part 2 contains articles upon dysentery and malaria. Out of 116 cases in which malarial parasites were found, 92 were malignant, nine benign tertian, and five quartan. Plague broke out in the Indian Bazaar in Nairobi on September 5th, 1912. As in previous outbreaks search produced many dead rats, some in various stages of decomposition, from beneath the floors of buildings in the bazaar.

Probably owing to the prompt use of Haffkine's vaccine the number of human cases since the outbreak began was small. Besides this outbreak, what were probably two small extensions occurred some miles away. In one case the disease apparently began in a grain mill in another native village.

Some experiments were carried out with *Glossina longipennis* to see if this fly conveyed trypanosomes. These were few in number and are not very conclusive.

G. C. Low.

Strachan (Henry). [C.M.G.] **Lessons in Elementary Tropical Hygiene. For the use of Pupils in Tropical Schools.**—xi., 116 pp. With 6 plates. 1913. London: Constable & Co., Ltd. [1*s.* net.]

The contents of this little work are as follows:—

Diseases and how to prevent them.—Necessity for the study of hygiene—Parasites—"Germs"—The Blood—Carriers of Diseases—Malaria and Mosquitoes (Lessons I to VII). Air, water, food (Lessons VIII to X) The dwelling—Disposal of refuse—Clothing—Habits and Customs (Lessons XI and XII). Quite a wide series of subjects it will thus be seen, and suitable as far as one can judge for use in advanced schools. The author's object was to impart in non-technical language a knowledge of the causes of the principal diseases in tropical countries and of the importance of strict personal cleanliness in their prevention. Some simple diagrams are given to illustrate the text and to assist the teachers in making blackboard drawings for their classes. It will certainly do the average pupil no harm to see magnified illustrations, such as are given in this book, of his ecto-parasites, fleas, lice, and bugs, but it is doubtful what useful service will be gained by the pupil gazing on a larval filaria depicted as twice the size of a whip worm, or other objects, which are only to be seen by the aid of a compound microscope. It is well to remember that the motto for all these primers should be simplicity. If this is attained only good can result from instilling sound sanitary knowledge and principles into the minds of the growing generation.

G. C. L.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 5.

TROPICAL SKIN DISEASES.

SABELLA (Pietro). **Studio Parallelo fra la Sifilide, la Framboesia e il Granuloma ulceroso delle Pudende, osservati nella Tripolitania (con Ricerche Istologiche e Sperimentali).** [Comparative Study of Syphilis, Framboesia, and Ulcerating Granuloma Pudendum in Tripoli.]—*Malaria e Malat. d. Paesi Caldi.* 1913. Mar. Vol. 4. No. 2. pp. 102-113.

The author gives an interesting comparative account of the three diseases. He emphasises the different clinical and histological aspects of syphilis and framboesia. As regards granuloma, he confirms in a general way the histological description given by GALLOWAY. While agreeing that some histological features of granuloma pudendum closely resemble those of yaws, he points out that the proliferative changes in framboesia mostly affect the epidermis, while in granuloma pudendum they affect chiefly the corium. At the end of his paper he brings forward tentatively, without committing himself, the suggestion that granuloma pudendum might be perhaps a late manifestation of yaws.

A. Castellani.

MAZZOLANI (D. A.). **Le Tigne, il Pian, le Piodermatosi ed altre Affezioni Cutanee curate negli Indigeni della Tripolitania.** [Tinea, Pian, Cutaneous Pyosis and other Skin Affections in Tripoli.]—*Riforma Medica.* 1913. Apr. 12. Vol. 29. No. 15. pp. 396-400. and Apr. 19. No. 16. pp. 425-428. With 10 figs.

The author quotes several cases of tinea, pian, various forms of cutaneous pyosis and ulcus tropicum observed by him in Tripoli, describing the principal symptoms and treatment. At the termination of his article he emphasises the importance of the practical results obtained in Tripoli by the establishment of a dispensary for skin diseases.

A. C.

(C17) Wt.2413/35—22.12.13. 2,000. 3.14. B.&F.Ltd. G11/4. A

CHALMERS (Albert J.) & O'FARRELL (W. R.). **Pyosis tropica in the Anglo-Egyptian Sudan.**—*Jl. Trop. Med. & Hyg.* 1913. Dec. 15. Vol. 16. No. 24. pp. 377-379.

The authors give a good general account of Pyosis tropica, of which they have observed two cases in Khartoum. They point out that though the affection was described and named by CASTELLANI in Ceylon in 1904, practically no literature exists on the subject. GABBI and SABELLA in 1912 reported some cases in Tripoli. The disease is a non-follicular pyosis characterized by the presence of thick yellow crusty lesions; when the crusts are removed, shallow irregular ulcers with non-undermined edges are seen, or more rarely small smooth nodules may be present.

The authors have grown from the lesions a Staphylococcus which they consider to represent a new variety: *Micrococcus pyogenes* var. *tropicus* Chalmers and O'Farrell 1913. The best treatment is by an autogenous vaccine.

A. C.

WISE (K. S.) & MINETT (E. P.). **Report of Tropical Diseases Research in the Government Bacteriological Laboratory, British Guiana, for the Six Months October 1912, to March 1913.**—Report to the Honorary Advisory Committee of the Tropical Diseases Research Fund. Received in Colonial Office, Sept. 30, 1913. [Proof.]

The bi[illegible]rly report of tropical diseases research in the Government Bacteri[illegible]al Laboratory, British Guiana, contains an interesting account of two cases of Tinea cruris. The disease is apparently rare in British Guiana. In both cases the lesions were quite typical. Scrapings were taken for examination, soaked in potash and mounted in glycerine; in both cases there was present a mycelium with a double contour showing true branching and composed of rectangular segments. The condition and cultural appearances closely resembled those of the organism described by CASTELLANI as *Epidermophyton cruris* in 1905, and by SABOURAUD as *Epidermophyton inguinalis* in 1907. Both the cases were treated with chrysophanic ointment, with good results.

A. C.

CULPEPPER (Wm. Louis). **A Case of Dhobie Itch (Tinea cruris), with Notes on the Cultivation of the Causal Fungus (*Epidermophyton rubrum*).**—*Amer. Jl. Trop. Diseases & Preventive Med.* 1913. Nov. Vol. 1. No. 5. pp. 397-401.

The author in a very complete paper gives an interesting account of a case of dhobie's itch in a military officer who contracted the affection in the Philippine Islands. The patient presented typical festooned lesions around the genitals and axillary regions.

After several fruitless attempts, the author succeeded in growing a fungus on sugar media producing dark reddish-pink colours. He comes to the conclusion that the fungus is the *Epidermophyton rubrum* Castellani 1905.

A. C.

CONOR (A.) & MARCHETTI (C.). **Un Nouveau Cas de Blastomycose observé en Tunisie.**—*Bull. Soc. Path. Exot.* 1913. Oct. Vol. 6. No. 8. pp. 556-559.

A native soldier was admitted into the hospital of La Goulette suffering from a large ulcer on the anterior aspect of the right fore arm. The lesion had lasted three months, having appeared as a small spot. In the axilla of the same side there was an abscess. There was no rise of temperature. The abscess was opened and two lymphatic glands were removed. From the pus so obtained inoculations were made into the peritoneal cavities of two guinea-pigs, this permitting an experimental study of the pathogenic organism. The parasites, as isolated from the spleen of the guinea-pig, gave the appearance of spherical or slightly ovoid cells measuring 2 to 6μ in diameter but without mycelium. In their interior the protoplasm showed fine and very refringent granulations.

The cultural characteristics are given in detail together with the results of the inoculation of the parasite into different animals.

One of the authors (Conor) in conjunction with BRUCH has already published a similar case in Tunis, viz., in an infant born of French parents.

G. C. Low.

SPLENDORE (A.). **Un'Affezione Micotica con Localizzazione nella Mucosa della Bocca, osservata in Brasile, determinata da Funghi appartenenti alla Tribù degli Exoascei (*Zymonema brasiliense*, n. sp.).**—Volume "*In Onore del Prof. Angelo Celli nel 25° Anno di Insegnamento.*" pp. 421-458. With 6 plates. 1912. Turin: Unione Tip.-Editrice Torinese.

The author, who has already published several interesting papers on the subject, gives again a description of a peculiar type of blastomycosis observed in Brazil, affecting often the oral mucosa and other mucous membranes. The affection was apparently first observed by LUTZ, in 1904, who isolated a fungus somewhat similar to *Oidium lactis*. LUTZ considered the condition to be identical with the so-called "Psorospermiasis" of POSADAS and WERNICKE, but Splendore, who has studied several cases very completely, comes to the conclusion that the affection is more similar to the blastomycoses of North America, though representing a separate variety.

To the Oidium or Monilia-like fungus isolated from the lesions the author gives the name of *Zymonema brasiliense*.

A. C.

SMITH (J. E.). **A Note on Pinta.**—*Amer. Jl. Trop. Diseases & Preventive Med.* 1913. Nov. Vol. 1. No. 5. p. 402. With 1 plate.

The author describes a case of generalized leucoderma; the skin was depigmented but apart from that was normal. No fungi were found. He rightly points out that the condition, though called pinta by some natives, has nothing to do with the true pinta of GASTAMBIDE and MONTOYA.

A. C.

PINOY (E.). **Actinomycoses et Mycétomes.**—*Bull. Inst. Pasteur.* 1913. Nov. 15. Vol. 11. No. 21. pp. 929-938. With 7 figs.; and Nov. 30, No. 22. pp. 977-984. With 5 figs.

The author, who is a well-known authority on fungi, gives an excellent review of the present state of our knowledge of actinomycosis and mycetoma. The term mycetoma is applied to pathological conditions caused by filamentous fungi, and characterised by the presence of grains in the pus. He divides the pathological conditions into two groups :—

1. Actinomycoses—in which the grains are formed by very thin, not segmented mycelial filaments.

2. True Mycetomes—in which the grains are formed by thicker mycelial filaments, segmented and with a well-defined membrane.

Actinomycosis may be caused by the following fungi :—

Nocardia Harz, *Cohnistreptothrix israeli* Kruse, *Nocardia madurae* Vincent, *Nocardia pelletieri* Laveran (this fungus the author is inclined to identify with *N. madurae*), *Indiella somaliensis* Brumpt, *Nocardia asteroides* Eppinger (Syn. *N. freeri* Musgrave and Clegg), *Cohnistreptothrix thibiergei* Pinoy and Ravaut.

The true mycetomata so far observed are due to fungi of the genus *Madurella*, *Aspergillus*, and *Sterigmatocystis*. The commonest fungus of the first mentioned genus is *Madurella mycetomi* Laveran, common in India and Africa. Another species found in North Africa is *Madurella tozeuri* Ch. Nicolle and Pinoy.

Of Aspergillus-like fungi the author mentions *Sterigmatocystis nidulans* Eidam var. *nicollei* Pinoy and *Aspergillus bouffardi* Brumpt.

The author points out the difficulties met with in experimentally reproducing mycetoma. He has succeeded with *Aspergillus nidulans* var. *nicollei* in pigeons, while NICOLLE has reproduced the disease in the same animals with *Madurella tozeuri*.

In conclusion the author advises an intensive treatment by potassium iodide; the patient should have a diet poor in kitchen salt, potassium iodide being substituted.

A. C.

SUTTON (Richard L.). **Mycetoma in America.**—*Jl. Amer. Med. Assoc.* 1913. May 3. Vol. 60. No. 18. pp. 1339-1342. With 6 figs.

Sutton gives a full description with illustrations of two cases of mycetoma, or Madura foot, which have come under his own observation. The recognition of this disease in America is of quite recent date. So far five other cases have been recorded as originating in America; of these two were Mexicans, one a French Canadian, and one an Italian; it is very doubtful whether the 5th case was true mycetoma.

The infections in both Sutton's cases belonged to the ochroid variety. The cases were typical. In one amputation of the foot was resorted to; the other patient refused this and was treated with potassium iodide, copper sulphate, and the X-rays as recommended by STELWAGON, various preparations of iodine being employed locally. After two months of this treatment the foot was somewhat less swollen but the improvement was very slight.

The animal experiments of MUSGRAVE and CLEGG are referred to.

These investigators isolated an organism from a typical case of three years' duration in a Filipino woman. To this organism they gave the name *Streptothrix freeri*, and with it performed inoculation experiments on 40 animals, in three of which (monkeys) they successfully induced Madura Foot.

[*Streptothrix freeri* Musgrave and Clegg 1907 is a synonym of *Nocardia asteroides* Eppinger 1890, as pointed out by Musgrave and Clegg themselves in later publications.]

A. C.

Carini (A.). **Sopra un Caso di Micetoma della Guancia.** [A Case of Mycetoma of the Cheek.]—*Giorn. Italiano d. Malattie Veneree e d. Pelle.* 1913. No. 2. 3 pp. With 2 figs.

The author describes a case of mycetoma of the left cheek in a European observed by him in Brazil. The grains found in the pus exuding from the sinuses were yellowish, rather soft and roundish. The microscopical examination showed the presence of abundant, very delicate, branching mycelial filaments with no claviform swellings. The fungus could not be cultivated. The patient was treated with potassium iodide in full doses with complete success.

A. C.

Arlo (J.). **Pied de Madura avec Envahissement du Triangle de Scarpa et de la Partie inférieure de la Paroi abdominale.**—*Bull. Soc. Path. Exot.* 1913. July. Vol. 6. No. 7. pp. 485-487; and *Ann. d'Hyg. et Méd. Colon.* 1913. April-May-June. Vol. 16. No. 2. pp. 440-442.

The author describes a case of mycetoma with invasion of Scarpa's triangle of the same side, seen on the Ivory Coast. The grains found in the pus were white; the microscopical examination revealed the presence of delicate mycelial filaments of a fungus, probably *Nocardia madurae*. Attempts at cultivation failed.

A. C.

Brault (J.). **Note sur les Cultures de** *Madurella mycetomi*.—*Bull. Soc. Path. Exot.* 1913. June. Vol. 6. No. 6. pp. 407-409.

In previous papers the author has given the characters on the usual laboratory media of *Madurella mycetomi* isolated from a case of black mycetoma in Algeria. In the present communication he gives the results of his attempts at cultivating the hyphomyceti on the indigenous shrubs and plants of Algeria. He has obtained successful results with ficus and some other plants.

A. C.

Wiener (Emil). **Ueber einen Vibrionenbefund in einem Yemengeschwür.** [On a Vibrio found in a Yemen Ulcer.]—*Wien. Klin Wochenschr.* 1913. Apr. 24. Vol. 26. No. 17. pp. 667-669.

The author at El Tor has isolated a germ with all the characteristics of the cholera vibrio from a Yemen ulcer or ulcus tropicum. Contamination of the ulcer by this vibrio may have taken place by the patient washing the sore with infected water.

A. C.

MARTINI. **Ueber einen Fall von Granuloma venereum und seine Ursache.** [A Case of Granuloma Venereum and its Etiology.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. March. Vol. 17. No. 5. pp. 160-166. With 1 plate.

The author describes fully a case of granuloma venereum in a German sailor. The bacteriological researches carried out in this case are interesting, the author coming to the conclusion that the cause of the malady is a capsulated diplococcus which he has grown. The germ is probably similar or identical with the one described by SIEBERT and FLU.

A. C.

WEINSTEIN (Henry). **A Description of Ainhum as seen on the Canal Zone, with Report of Interesting Cases occurring in One Family.**—*Southern Med. Jl.* 1913. Oct. Vol. 6. No. 10. pp. 651-656.

A description of the disease and a historical resumé is first given and the etiology is discussed. The cases seen by the author were specially interesting, because there was a family history in them revealing a strong hereditary tendency affecting all the males in three generations, and apparently transmitted by the male progeny. Further, a detailed histological examination was made of one of the amputated toes by DARLING who found the following changes :—

"The keratinous ring presents the usual thick horny appearance seen in this condition. It rises above the general level and is lodged in a fossa lined on either side by normal epithelium. This ring is made up of thick laminae of keratinous squamous epithelium. The stratum malphighii is relatively narrow and the corium beneath is bereft of papillae and is extremely narrow. In fact, the corium and the periosteum of the bone so rapidly merge into one another that they can hardly be differentiated. This obliteration of the papilla, it is very evident, is due to the constricting horny ring.

"The stratum malphigii increases in amount as the normal skin is approached and its cells become larger and vesicular. The papillae also become more evident, though they are still nodose and not deep and filiform as in the normal skin at this location. At the margin of the horny ring the corium is greatly altered by ulceration, for it is infiltrated by polymorphonuclear leucocytes, red cells and fibroblasts. Many newly formed arterioles and capillaries are also seen. At this point the usual picture of ainhum is not seen, but rather one of ulceration and repair." In the tissue distal to the ring "the epithelium and corium present the usual deep filiform appearance usually seen in the skin of this region, and the blood vessels, sweat glands, nerve bundles and the paccinian corpuscles appear normal."

G. C. L.

YAWS.

KLOPPERS (J. W. E. R. S.). **Opmerkingen over Framboesia.** [Observations on Yaws.]—*Geneeskundig Tijdschrift voor Nederlandsch-Indië.*—1913. Vol. 53. No. 1. pp. 18-31.

It seems to be a pressing question in Java whether it is desirable to treat yaws on a extensive scale by means of salvarsan, having regard to the cost of the remedy. This question was referred to the author for decision by his superiors in the public service, and he answers it in the negative.

Syphilis is apparently not very common amongst the natives of Java, while yaws is very prevalent, and therefore it becomes a matter of some practical importance whether an expensive remedy should be squandered upon a comparatively benign complaint, instead of being reserved for the more virulent one. This, and the allied question of encumbering hospitals with cases which would not otherwise present themselves for treatment, are discussed by the author at considerable length. A large part of the paper is taken up with a comparison between the clinical symptoms of yaws and those of syphilis, of a nature not calculated to interest the English reader, who finds this subject amply dealt with in the text-books. The article also contains a number of particulars as to the distribution of yaws in various parts of Java, which are of no general interest.

J. B. Nias.

KERNÉIS (J.). MONFORT (F.) & HECKENROTH (F.). **Quelques Remarques sur le Pian au Congo français. Pian et Ulcères phagédéniques traités par le 606.**—*Bull. Soc. Path. Exot.* 1913. Apr. Vol. 6. No. 4. pp. 243-247.

Cases of yaws in the French Congo are far from rare; the disease was first described in that region by BASTIAN in 1881 under the name of "Aboukoué." The clinical appearance of the disease does not much differ from that observed in other countries, but severe symptoms such as fever during the incubation period are rare. Salvarsan acts well, but relapses may occasionally take place notwithstanding the treatment. The authors have used salvarsan in ulcus tropicum as well as in yaws with good results.

A. Castellani.

WINDWARD ISLANDS [St. Lucia]. **Extract from Annual Reports on Hospitals and Dispensaries, 1912-13.**—Report to tho Honorary Advisory Committee of the Tropical Diseases Research Fund.

The Extract from the Annual Reports on the Hospitals and Dispensaries of the Windward Islands contains an account of the use of salvarsan in the Yaws Hospital. Of 245 patients treated with this drug during the year, 229 were discharged cured. This result shows the advantage of the salvarsan method over the old treatment. The dose given is 0·6 gm. and the intramuscular method only is used at present. The after treatment consists of rest in bed, sea-bathing,

and mercury in Donovan's solution. So far there have been twelve recurrences of cases, which is 5 per cent. of the total number treated. These cases have been again admitted for treatment.

A. C.

COCKIN (R. P.). **Treatment of Yaws by Intramuscular Injections of Salvarsan. A Report on a Series of 45 Cases treated at the Yaws Hospital, St. George's, Grenada, B.W.I.**—*Lancet.* 1913. Dec. 6. pp. 1609-1610.

The author has treated 45 further cases of yaws with salvarsan given intramuscularly with very good results. He prefers the intramuscular to the intravenous methods, there being no need of skilled nursing subsequent to the injection. [See also this *Bulletin*, Vol. 1. p. 144.]

A. C.

RADLOFF. **Frambösie und Salvarsan.**—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. July. Vol. 17. No. 13. pp. 459-460.

Atoxyl had no action on a case of framboesia while salvarsan given intravenously was most successful.

A. C.

i. SCHERSCHMIDT (Arthur). **Erfahrungen mit Joha bei Frambösie.**—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Aug. Vol. 17. No. 16. pp. 552-559.

ii. WECK. **Bericht über Erfahrungen mit Joha.**—*Ibid.* pp. 559-564.

i. The author gives the results obtained by treating yaws patients with "Joha," the trade name given to a suspension of salvarsan in oil. He comes to the conclusion that this preparation given intramuscularly is less successful than ordinary salvarsan given intravenously; its higher cost is also against its use for natives.

ii. Weck on the other hand comes to the conclusion that "Joha" is very useful in native practice.

A. C.

SLEEPING SICKNESS.

SIERRA LEONE. **Memorandum by the Principal Medical Officer** [RICE (Thos. E.)], **with Reports by** Drs. H. E. ARBUCKLE **and** John Y. WOOD.—Received at the Colonial Office December 16, 1913. [MSS.].

An account is here given of 5 cases of sleeping sickness discovered in Freetown, Sierra Leone. Three other cases had previously been reported, so that in all 8 cases of the disease were recognised in Freetown during the second half of the year 1913.

Soon after the second case was reported, a circular was sent to each Medical Officer asking for information regarding the existence of sleeping sickness in his district and the prevalence of *Glossina palpalis*. From the replies received it would appear that the disease has only, so far as the Protectorate is concerned, been recognised in the Koinadugu District, the Medical Officer of which reports 3 cases and alludes to others.

[Eighteen cases of sleeping sickness were diagnosed in Sierra Leone by GRATTAN in 1905.*]

W. Yorke.

CHATARD (J. A.) & GUTHRIE (C. G.). **Human Trypanosomiasis: Report of a Case observed in Baltimore.**—*Amer. Jl. Trop. Diseases & Preventive Medicine.* 1914. Jan. Vol. 1. No. 7. pp. 493-503. With 1 plate.

This paper gives a clinical account of a case of sleeping sickness in a European; the disease was contracted in the Belgian Congo. No new points are brought out. Between the first course of treatment, on the discovery of trypanosomes, and the patient's being seen by the authors he carried on his occupation for three years and had no occasion to consult a doctor.

W. Y.

THIROUX (A.) & PELLETIER (J.). **De la Méningite aiguë dans la Trypanosomiase humaine.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et de Méd. Coloniales.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 1188-1190.

In sleeping sickness meningeal symptoms appear suddenly at any time during the second stage of the disease and are due to an invasion of the meninges. The first symptom observed is a violent and persistent headache; but as headache is encountered in ordinary forms of sleeping sickness, only a relative importance can attach to this symptom. That which precedes acute meningitis is, however, more intense and more persistent. Following the headache, which sometimes precedes other symptoms by eight or ten days, are fever and Kernig's sign; later is noticed stiffness of the neck and spine accompanied often by a fall of temperature.

---

* *Jl. Royal Army Med. Corps.* 1906. Vol. 7. pp. 485-493.

Acute meningitis may supervene during treatment; the course of of the disease is not modified by atoxyl medication and death soon occurs. It may appear early in the disease when the symptoms have not been sufficiently characteristic to permit of a clinical diagnosis.

The possibility of a secondary infection with epidemic cerebrospinal meningitis in such countries as Senegal must be considered. The authors negative this however in the majority of cases. Details of two cases are given. In the first, lumbar puncture yielded an absolutely transparent liquid containing but few mononuclear leucocytes, no polymorphonuclear leucocytes and a few trypanosomes. Examination of a stained specimen of the deposit obtained by centrifuging did not reveal the presence of meningococci.

W. Y.

LUNDIE (Alexander). **The Detection of Trypanosomes in Animals**—*Jl. Trop. Med. & Hyg.* 1914. Jan. 15. Vol. 17. No. 2. p. 22.

The following method for diagnosing the presence of trypanosomes in animals, where plenty of blood can be obtained, was found to be useful. Blood is allowed to flow directly from the cut throat into a test tube containing 5 gr. of potassium citrate dissolved in 5 cc. of sterile water, until the tube is three parts full. After mixture of the contents by rolling the tube it is set aside until time can be found to examine it. Within half an hour there is always a little clear fluid on the top of the blood and if there are any trypanosomes at all in the blood they will certainly be found in this situation. In films made from the clear fluid the trypanosomes stain well.

The author states that this method can be used for studying the development of trypanosomes. To study the life history of the trypanosomes in tsetse flies, one can imitate the chemical changes in the fly's stomach fairly well by mixing the fresh blood with a sufficient volume of hydrochloric acid, diluted so as to contain ·02* per cent. by weight of the acid.

W. Y.

ROUBAUD (E.) & LAFONT (A.). **Expériences de Transmission des Trypanosomes humains d'Afrique par les Moustiques des Habitations** (*Stegomyia fasciata*).—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 49-52.

This paper records attempts made at Dakar, French West Africa, to transmit human trypanosomes—*T. gambiense* and *T. rhodesiense*—by means of laboratory bred mosquitoes. The mosquitoes employed were mainly *Stegomyia fasciata*, but with these there were also a few *Culex fasciatus* and *Culex decens*.

The mosquitoes were bred out from the larvae in large grass vessels 2 × 1·5 × 1·5 metres in size, placed in a large mosquito-net chamber. The experimental animals, partially denuded of hair, were placed in wire cages introduced into the chamber. The authors endeavoured

* According to a communication received from the author, 0·2 is the correct percentage.

to vary as far as possible such conditions of experiment as the variety of the animals employed, the number of trypanosomes in their blood, the length of time they were exposed to the bites of the mosquitoes and the relative distance between the cages containing the healthy and the infected animals.

Details of the various experiments are given. It was found that transmission of the trypanosomes did not occur, in spite of the large number of mosquitoes employed, except when the cage containing the healthy animal was placed quite close to that containing a heavily infected animal. Separation of the cages by one metre is sufficient to protect the healthy animal from infection. The authors suggest however that such negative results do not preclude the possibility of the transmission to man of trypanosomes by mosquitoes in nature. The animals used (monkeys, rats and guinea-pigs) are not so easily bitten by mosquitoes as man, especially the native on account of his scanty clothing.

These experiments prove that it is possible for mosquitoes to act as mechanical vectors of human trypanosomes in a limited enclosure and they show that the active virus is not conserved by the mosquito beyond 24 hours. [For other works on this subject see this *Bulletin* Vol. 2. p. 255 and *Sleeping Sickness Bulletin* Vol. 1, p. 70.]

W. Y.

i. Duke (H. Lyndhurst). **Wild Game as a Trypanosome Reservoir in the Uganda Protectorate: with some Criticisms on the Current Methods of Diagnosing these Protozoa.**—*Arch. f. Protistenkunde.* 1914. Jan. 6. Vol. 32. No. 3. pp. 393-406.

ii. **Wild Game as a Reservoir for Human Trypanosomes. An Analysis of the Available Evidence from the Northern Shores of Lake Victoria Nyanza.**—*Brit. Med. Jl.* 1914. Feb. 7. pp. 289-292.

In these papers the author deals with the question of the wild game as a reservoir of human and animal trypanosomes. The observations here recorded were published in reports to the Royal Society and have already been reviewed (see *Sleeping Sickness Bulletin* Vol. 4. pp. 171 and 320 and this *Bulletin* Vol. 2. p. 241).

The second paper is entirely devoted to a discussion whether the *gambiense*-like trypanosome found by the author in 'wild fly' and situtunga on Damba Island are descendants of the *T. gambiense* which caused the recent epidemic in Uganda or whether they are merely parasites of the antelope and not capable of surviving in the human host. The evidence accumulated is examined in detail and the points demanding attention are considered in the form of a series of question and answers.

After an exhaustive consideration of the subject the author writes: "The available evidence justifies the conclusion that the trypanosome recovered from the Damba situtunga and from the wild *Glossina palpalis* in the islands and on the mainland coasts is a descendant of the *T. gambiense* of the epidemic."

W. Y

BECK (Max). **Untersuchungen über ein am Rovuma (Deutschostafrika) vorkommendes Trypanosoma beim Menschen.** [Investigations on a Trypanosome found in Man in the Rovuma District.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1914. Feb. Vol. 18. No. 3. pp. 97-101. With 1 plate.

A description is given of the human trypanosomes causing the small foci of sleeping sickness in the Rovuma district of German East Africa near the Portuguese boundary. In all, 72 cases have been discovered up to the present. So far as is known the disease is spread exclusively by *Glossina morsitans*. In the infected districts 8-10 per cent. of these flies were infected with trypanosomes, but as experimental animals were not available the author is unable to state how many were infective nor to identify the trypanosomes.

The human trypanosome was compared with *T. brucei* obtained from a tsetse infected mule. A brief account of the morphology of the human trypanosome is given; comparative measurements of the two trypanosomes could not be undertaken owing to absence of a micrometer eyepiece. On examining the pathogenicity of the two strains it was found that the human trypanosome was the more virulent. Dogs infected with this strain died on an average in 18-21 days, monkeys in 20-28 days and rats in 10-12 days dogs infected with *T. brucei* lived for 29 days, monkeys for 40 days and rats for 18-20 days. The incubation period was longer in the case of the latter parasite. Certain irregular and rounded parasites (figured in the plate accompanying the paper) were found in animals infected with the human trypanosome.

Further attempts were made to differentiate the two parasites by aid of certain biological tests—agglomeration, trypanolysis, and cross-immunisation. As a result of these experiments the author concludes that the human trypanosome is not identical with that found in wild game (waterbuck and eland).

The following results were obtained from an examination of domestic animals and wild game in the infected regions. Of 8 dogs 5 were infected, of 3 goats none, 2 of 3 waterbuck and 1 of 2 eland; a gnu, a leopard and a spotted hyena were negative, as were also a large number of monkeys and birds.

W. Y.

PRENTICE (George). **Sleeping Sickness, Tsetse, and Big Game.**—*Brit. Med. Jl.* 1914. Feb. 7. pp. 293-294.

The author gives his experience of the relation of tsetse fly and wild game in Nyasaland and Rhodesia where with the exception of three furloughs he has worked since 1894. He states that time and again he travelled with riding animals and dogs through districts where in the pre-rinderpest days Arab caravans used to travel at night in order to save their animals from attacks of tsetse. Yet in 1894-6 both Nyasaland and Rhodesia were remarkably free from tsetse. The explanation given is that after the rinderpest had killed off most of the big game tsetse fly disappeared. The author states that since 1894 he has watched the spread of tsetse, until at the present time it swarms in districts where previously not a single fly was encountered.

A brief account is given of the ravages wrought by trypanosome diseases in domestic stock and it is suggested that there is at the present time a considerable amount of sleeping sickness in Nyasaland. Dealing with the assertion that tsetse can and does exist where it cannot possibly depend upon game for its sustenance, game being absent, Prentice states that this does not hold good of *G. morsitans* in Nyasaland and Rhodesia. He does not believe that if the game were driven out tsetse would attack man and his domestic animals more vigorously than at present, and states in support of this that when rinderpest killed off the game the tsetse did not invade the villages but disappeared or remained only in small patches near the foothills, where small herds of game had escaped the rinderpest. There is ample proof that wherever game is killed off by disease or hunted out *G. morsitans* disappears and there is no proof to the contrary.

The author is of opinion that in order to eradicate the disease a severe onslaught must be made upon the wild animals until these are driven back from human settlements and from public highways.

W. Y.

Kolle (W.). Hartoch (O.) & Schürmann (W.). (i) **Weitere Mitteilungen über chemotherapeutische Experimentalstudien bei Trypanosomeninfektionen.** [Further Experimental Studies on the Chemotherapy of Trypanosomiasis.]—*Deut. Med. Wochenschr.* 1914. Jan. 29. Vol. 40. No. 5. pp. 212-214.

(ii) **Chemotherapeutische Experimentalstudien bei Trypanosomeninfektionen. ii Mitteilung.**—*Zeitschr. f. Immunitätsforsch. u. experim. Therapie.* 1. Teil. Orig. 1914. Jan. 22. Vol. 20. No. 5. pp. 436-475.

These papers give an account of further work on the treatment of animals, experimentally infected with trypanosomes, by means of antimony preparations. The previous communications reviewed in this *Bulletin* (Vol. 2, pp. 134 and 351), gave the results obtained in the treatment of small laboratory animals. It will be recalled that the chief methods recommended were the intramuscular injection of Trixidin (antimony trioxide in oily suspension), and the application of insoluble preparations of antimony in the form of ointment. The authors found that the estimate of the value of intramuscular injection of Trixidin, which they had formed from their experiments upon small animals, proved too high when they applied the treatment to large animals. In mice and guinea-pigs little or no local reaction followed the intramuscular injection of the drug, but quite different results were observed in rabbits, monkeys and dogs. In these animals in most cases injection into the muscles was attended by local swelling, which did not disappear but proceeded to abscess formation, with spontaneous bursting in cases where incision was not performed. Rabbits were affected by a wide spread necrosis of tissue rather than a definite abscess, and incision was here of little service as the process went on to affect the deeper structures, and the animals died after much loss of weight and condition. Occasionally however even in rabbits large doses were without unpleasant sequelae. The complication of abscess formation compelled the authors to modify

their view that Trixidin by intramuscular injection would be found a useful means of treating trypanosomiasis in large animals. Efforts to counteract the tendency to abscess formation were made and many drugs used in conjunction, for example calcium chloride, with a view to obviating this effect, but without success. The plan of making small and numerous injections of Trixidin in various parts of the body was also unsuccessful in preventing abscess formation. The method of intramuscular injection was therefore abandoned in favour of intravenous injection of antimony trioxide in physiological salt solution. They found it necessary for this purpose to obtain a much finer subdivision of the particles of the trioxide than exists in the commercial preparation. Not only would such subdivision eliminate the danger of embolism, but also by providing a greater surface would give a more active therapeutic effect. By special methods they obtained a very fine suspension of the trioxide in salt solution suitable for injection intravenously and devoid of danger from embolism.* They have made experiments with this suspension on animals and consider that it can be used in the case of human beings. They intend to publish later an account of the experiments undertaken with this colloidal-like preparation of antimony.

The method of inunction, which the authors described in their previous paper in regard to mice, has been applied to larger animals (dogs). The ointment used was a 20 per cent. concentration of Dimethyl-phenyl-pyrazolon-antimon-trichlorid Eucerin (SCHEITLIN), and the sites for inunction were the shaved belly and chest and the inner surface of the hind legs. The effect on the skin which had been observed in mice was also noted in dogs, namely a slight chickenpox-like eruption which soon disappeared. Repeated inunctions at intervals of 5-12 days after the first appearance of parasites in the blood, and varying in number from 1 to 9, were employed. Most of the dogs died of chronic poisoning, but in all cases the parasites in the peripheral blood diminished in number, and in three cases a definite negative condition of the blood resulted as shown by subinoculation.

Large numbers of tables are given showing in detail the results of treatment of various laboratory animals by the different methods. The prophylactic value of antimony trioxide in guinea-pigs and rabbits is shown by experiments, where comparatively small doses given intravenously prevented the development of dourine infection. The conclusions are:—

The therapeutic effects of antimony trioxide observed in mice infected with trypanosomes are also observed in chronic infections in the larger animals, if the formation of abscesses is avoided by means of using intravenous injection. The combination of antimony trioxide with other soluble, quickly operating trypanocides ought to prove of great value in the treatment of trypanosome infections.

The simple application of insoluble organic antimony compounds in the form of an ointment can influence favourably the disease processes in dogs infected with dourine. The fact that dogs have a marked intolerance to antimony does not exclude the possibility of curing other animals by the inunction method.

A postscript refers to the treatment of naturally infected cattle

* PLIMMER found this out and published it in 1910. His method (intravenous injections of metallic antimony in fine division) has been used on man by RANKEN, more than 1,000 injections having been given. (This *Bulletin*, Vol. 1, p. 663.) A.G.B.

in East Africa by Professor OSTERTAG with Trixidin. Cattle treated by him remained free from trypanosomes for two months (to the time of writing).

W. Y.

BRIEGER (L.) & KRAUSE (M.). **Neues über Tryposafrol und Novotryposafrol.**—*Berlin. Klin. Wochenschr.* 1914. Jan. 19. Vol. 51. No. 3. pp. 101-103.

Reference is made to the previous work of the authors on the treatment of experimental trypanosomiasis by safranin derivatives, more especially that designated 'Tryposafrol' (see *Sleeping Sickness Bulletin* Vol. 4, pp. 60 and 328).

The present paper is a rejoinder to RIETZ and LEUPOLD who stated that tryposafrol is of no value as a remedy in mice, rats and guinea-pigs experimentally infected with various strains of *T. brucei* (see this *Bulletin* Vol. 2. p. 354). The authors consider that RIETZ and LEUPOLD did not follow their directions for the administration of the drug. They procured the strains (nagana ferox of EHRLICH and MORGENROTH's strain of *T. brucei*) used by RIETZ and LEUPOLD and treated animals infected with these strains themselves. Of 44 guinea-pigs treated with the dye all were alive and negative on the 90th day, whereas all the control animals were dead by the 60th day.

In order to test the toxicity of the drug a dog was given 1 gm. daily for 50 days; it was then killed and examined. Nothing pathological was found.

The authors intend to criticise the unfavourable results of treating human sleeping sickness recorded by LURZ (see this *Bulletin* Vol. 2. p. 456) in a future communication.

A summary is given of the excellent results obtained by various workers who have employed tryposafrol in the treatment of such infections as foot and mouth disease, red water in cattle, and distemper in dogs. In all these conditions the drug had a remarkably beneficial action.

W. Y.

CIUCA (A.). **Action des Abcès de Fixation sur la Trypanosomiase expérimentale du Cobaye et sur son Traitement par l'Atoxyl.**—*Ann. Inst. Pasteur.* 1914. Jan. Vol. 28. No. 1. pp. 6-20.

Reference is made to the fact that abscesses produced by various substances, especially essence of terebene, have been used in the treatment of divers infectious maladies with the object of aiding other medicants in the amelioration and cure of the disease. L. MARTIN has noticed considerable benefit in a European case of sleeping sickness, following the formation of abscesses produced accidentally by subcutaneous injection.

Technique. The author decided to study this subject experimentally and for this purpose used guineapigs infected with surra and with *T. brucei* of Uganda. (The work of LAVERAN and THIROUX showed that animals infected with these trypanosomes could not be cured with atoxyl alone). The ordinary essence of terebene of commerce was employed and amounts varying between 0·5 and 1 cc. were injected as high up as possible on the external surface of the thigh. The animals were much

disturbed during the half hour following the injection. After 24 hours the site of injection was warm and looked inflamed: the inflammation reached its maximum in 72 hours. The abscess forms after 4 or 5 days and should always be opened; the pus is thick, of a dirty white colour, and smells strongly of terebene; when dressed carefully the abscess heals in 10 days. The amount of atoxyl administered was 1·5 to 2 cc. of a 1 per cent. solution.

Experiments. In all, 42 guinea-pigs were infected with *T. brucei* of Uganda and 10 with *T. evansi*. Of the first 42 animals 11 served as controls; they died in from 11 to 56 days (average 30). Of the second 10 animals 4 were used as controls and died in from 17 to 41 days. The remaining 37 guinea-pigs were treated either with essence of terebene alone, or with this in conjunction with atoxyl.

Group A., consisting of guinea-pigs treated only with essence of terebene. In the first series of experiments the animals received one or more injections, the first being given at the same time as the inoculation of the trypanosomes. In the second series a single injection of terebene was given at the height of the infection. It was found when the drug was given at the same time as the inoculation of trypanosomes that the incubation period was prolonged. When administered at the height of infection the drug caused a diminution in the number of trypanosomes. This diminution commenced after 24 to 48 hours and led frequently to a complete disappearance of parasites for 4 or 5 days: the parasites subsequently reappeared and the animals died, but life was usually considerably prolonged.

Group B., consisting of guinea-pigs treated with atoxyl and essence of terebene. In the first series of experiments two injections of terebene and atoxyl were given, whilst in the second series the animals received several injections of the drugs. As a result it was observed that repeated injections of atoxyl in animals infected with *T. brucei* of Uganda generally produced either no effect at all or merely a transitory disappearance of the trypanosomes; only rarely was a sterilisation of longer duration noted. When atoxyl was given in conjunction with terebene, a disappearance of the parasites lasting several days always resulted. If the injections of atoxyl are frequently repeated in animals in which an abscess has been produced by terebene, the trypanosomes almost always disappear for a considerable period; there is great prolongation of life and sometimes complete cure. Guinea-pigs of 400 to 600 grammes usually bear 12 or 13 or even more injections of atoxyl (each injection being ·015 to ·02 grammes). It is not necessary to exceed a dose of 1 cc. of essence of terebene, but the number of doses is limited by the emaciation produced. The combined treatment is superior to treatment by atoxyl alone. The abscess of fixation produced by the essence of terebene probably facilitates the formation of trypanotoxyl, the true active substance of atoxyl on the trypanosomes in the infected organism.

The author considers that one ought to use essence of terebene in the treatment of trypanosomiasis in animals resistant to arsenicals, in order to facilitate the action of the latter substances on the trypanosomes. Probably this method of treatment is most suitable in the case of larger animals when one can produce local abcesses without general debility of the organism.

W. Y.

HECKENROTH (F.) & BLANCHARD (M.). **Etat des Méninges et Injections intra-rachidiennes de Néosalvarsan dans la Trypanosomiase humaine.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 63-68.

In the course of previous work (see this *Bulletin* Vol. 2, p. 587), it was shown that, although one or two intravenous injections of salvarsan and of neosalvarsan cause in certain cases a definite sterilisation of the blood, nevertheless the course of the disease is not arrested and the patient dies. In such cases the cerebrospinal fluid always contains many lymphocytes, and trypanosomes on which the drug has no action. This observation led the authors to examine the meninges of sleeping sickness patients as regards their permeability to neosalvarsan, and to determine the effect of intra-meningeal injection of the drug.

It is generally recognised that although in health the meninges are impermeable from without inwards this property disappears when the membranes are damaged by various infections. Even at the beginning of trypanosomiasis the meninges are involved, as is shown by the lymphocytosis occuring in the cerebrospinal fluid and also by autopsy, when meningeal lesions are frequently the only microscopic evidence of this disease.

Experiments were undertaken to ascertain if the lesions of the meninges in sleeping sickness would permit the passage into the cerebrospinal fluid of various drugs (potassium iodide, atoxyl, emetic, and salvarsan), of the normal haemolysin against sheep's red cells, and of complement. The results were negative ; to all these substances the meninges were impermeable.

Reference is made to the unfavourable results obtained by KOPKE with subdural injection of salvarsan and neosalvarsan in sleeping sickness cases (see this *Bulletin* Vol. 2, p. 586).

The authors decided to repeat this method of treatment in very bad cases to ascertain whether the inactivity of the medicant, when given intramuscularly in these cases, is due to impermeability of the meninges to the drug or to a special resistance of the trypanosomes found in the cerebrospinal fluid, which may possibly have become resistant owing to the passage of very minute quantities of the drug into the cerebrospinal fluid.

Neosalvarsan (1·3 to 2 cgm. in 3 cc. of distilled water) was injected subdurally in 9 patients. Before the injection was made 10 cc. of cerebrospinal fluid was removed and examined. In all cases there was considerable lymphocytosis with more or less numerous trypanosomes. A second lumbar puncture was made eight days later, when it was found that the trypanosomes and lymphocytosis had disappeared. This condition was maintained over a period of five months in one of the patients, but in others the survival was too short or the date of injection too recent to allow of any conclusions being drawn. In contradistinction to the observation of KOPKE the authors have not observed any unfavourable sequelae, but the injections were not followed by any marked amelioration of the general condition.

A consideration of the results of treating numbers of cases in which the central nervous system is involved, at the Pasteur Institute of Brazzaville, shows that no patient in this condition has been cured.

The non-success resulting from subdural injections of neosalvarsan indicates that at a certain stage the meningeal lesions are irremediable, in spite of the fact that the treatment may sterilise the cerebrospinal fluid and cause the lymphocytosis to disappear.

W. Y.

GROSSULE (Virgilio). **Sulla Guaribilita della Trypanosi o Malattia del Sonno.** [On the Curableness of Sleeping Sickness.]—*Gazz. d. Ospedali e Cliniche.* 1913. Oct. 30. Vol. 34. No. 130. pp. 1359-1361.

The author observes that there is a tendency on the part of certain sections of the press to propagate the idea that sleeping sickness is greatly diminishing in some parts of Tropical Africa, and to attribute this diminution to the actual cure of individual cases by means of atoxyl. He points out how difficult it is to be sure that any case has been cured by treatment, and emphasises the view that improvement in the general condition of the patient, and absence of parasites from the peripheral blood and the glands, are of little value when an opinion is to be formed as to the success of treatment. He relies upon the examination of the cerebrospinal fluid, and considers as normal a clear cerebrospinal fluid which contains no parasites and a number of lymphocytes below 6 per cmm., and an amount of total albumin equal to 0·25 per cent. or less. Taking this standard the author formerly considered that if the cerebrospinal fluid remained normal for one year from the date of treatment the patient could be considered cured. He has now modified his opinion on account of a case studied by him, in which the cerebrospinal fluid was normal on July 20th, 1910, two years after the cessation of treatment, but on August 28th, 1912, that is to say four years after treatment, the cerebrospinal fluid was found to contain parasites and to show considerable lymphocytosis. The patient had never left the camp, and infection could not have occurred there as all patients were treated with atoxyl before admission and subsequently treated regularly, and further there are no species of Glossina in the environs of Stanleyville.

Of 1,100 cases treated a hundred left the camp apparently cured. On account of the difficulty in following cases up in view of the prolonged periods during which the cerebrospinal fluid may be normal and yet relapse occur, the author thinks the percentage of real cures must be very small indeed.

W. Y.

LAVERAN (A.) & MARULLAZ (M.). **Essais d'Immunisation contre le Nagana expérimental des Souris.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 53-58.

The authors have repeated the experiments of RONDONI and GORETTI, which showed that it was possible to immunise mice against nagana by means of living trypanosomes treated with weak solutions of salvarsan (see this *Bulletin* Vol. 2, p. 355).

Laveran and Marullaz worked with *T. brucei* (nagana ferox of EHRLICH); eight experiments were done, six mice being used in each.

The strength of the solutions of salvarsan used varied between 1 in 1,000 and 1 in 40,000. Details of four of the experiments are given. The results obtained differed notably from those of RONDONI and GORETTI. Of the 48 mice treated not a single one exhibited any lasting immunity; 30 became infected after vaccination, and of the 18 which remained free 16 became infected upon subsequent inoculation of the active virus. The two animals which resisted the first inoculation of active virus succumbed to a second made shortly after the first.

The authors consider that slowing of the movements of the trypanosomes is no sufficient criterion of the action of salvarsan. Salvarsan in dilutions of 1 in 20,000 to 1 in 40,000 is useless for the preparation of vaccines with the strain nagana ferox. With dilutions of 1 in 5,000 to 1 in 10,000 there is a retarding of the incubation period, whilst with vaccines prepared with dilutions of 1 in 1,000 and 1 in 2,000 results are obtained which are analogous to those following the use of dead trypanosomes—the mice do not become infected but succumb on subsequent inoculation of virulent virus.

W. Y.

DELANOË (P.). **Des Variations du Pouvoir Infectieux et de la Virulence du *Trypan. dimorphon*, à partir d'Infections naturelles présentées par les Boeufs et les Moutons.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 58-63. Note préliminaire.

During the second half of last year the author examined the blood of more than 3,000 cattle and sheep in various portions of Upper Senegal and Niger. The only trypanosomes encountered by him were *T. cazalboui*, *T. dimorphon* and *T. pecaudi*.

In this communication the author deals with the infectivity of the various strains of *T. dimorphon* isolated. Of the seven strains examined five—taken from 3 cattle and 2 sheep—were not inoculable at the first attempt in either rats or guineapigs, one strain infected rats but not guineapigs, whilst the seventh proved to be virulent for both animals. The negative results obtained in the case of the first five strains show that in certain cases the natural immunity of rats and guineapigs to *T. dimorphon* is complete. In the case of the sixth strain a rat and guineapig were inoculated. At the end of three months the guineapig had not become infected; the rat was in excellent condition and trypanosomes—very few in number—had only been found in its blood on the 21st and 81st days. It appears then that *T. dimorphon* may infect rats without producing in these animals any pathogenic condition. On the other hand the result of inoculation of the seventh strain indicates that *T. dimorphon* may at first inoculation infect both rats and guineapigs and produce in them an acute disease rapidly terminating in death.

No morphological distinction could be recognised between these various strains; they were all short aflagellar trypanosomes. In a future communication the author is to describe experiments in which it is shown that it is possible to render pathogenic to rats a strain of *T. dimorphon* which at first was not infective for these animals.

[This paper should be compared with that of BLACKLOCK and YORKE

on the identity of *T. congolense* and *T. nanum*. (this *Bulletin* Vol. 3, p. 169)].

W. Y.

LAVERAN (A.). **L'Agent du Debab d'Algérie est le *Trypanosoma soudanense* (Laveran).**—*Compt. Rend. Acad. Sciences.* 1914. Jan. 12. Vol. 158. No. 2. pp. 93-96.

Prof. Laveran has made some experiments to establish the identity of *Trypanosoma soudanense* with that of debab of dromedaries. The virus of *T. soudanense* came originally from a dog inoculated at Ségou, Upper Niger from a dromedary and brought to France in 1906. It has since been maintained in guineapigs in Laveran's laboratory. The debab virus was sent by Ed. SERGENT in a guinea-pig inoculated from a dromedary, nomad between Touggourt-Biskra and Oued-Athménia-Châteaudun. Experiments made with three goats are detailed. They show that a goat immune to *T. soudanense* is refractory to the virus of debab, while a control kid and a goat immune to surra, when inoculated with the virus of debab under the same conditions as the first goat, became infected. The trypanosome of debab is thus identified with *T. soudanense* and has no connection with *T. evansi*.

Former experiments made on two bovines at Alfort have shown that animals immune to debab are also refractory to *T. soudanense*. The demonstration of identity of the two viruses is thus considered complete.

The strain of *T. soudanense* in Laveran's laboratory was a little more active than the Algerian virus of debab, possibly explained by animals having immunity to debab having been infected previously by *T. soudanense*. Absolute cross-immunity experiments, i.e. done in both directions, must be insisted upon in order to avoid errors arising from this source.

H. B. Fantham.

BAYMA (Theodoro). **Molestia de Carlos Chagas (Nota sobre sua verificaçao parasitologica no Homem, em S. Paulo.)** [Chagas's Disease. Note on the finding of the Parasites in Man in S. Paulo.] —*Revista Med. de S. Paulo.* 1914. Jan. 15. Vol. 17. No. 1. p. 3.

On the publication of the researches of Carlos CHAGAS into the disease which goes by his name, the workers at the pathological institute of San Paulo resolved to ascertain the possibility of its existence in the State of that name. Carriers of the parasite were soon found in three different species of Triatoma and the conviction gained ground that there must be foci of infection amongst human beings in the population as well, probably not of a very extensive character. Members of the staff of the institute were sent in different directions to investigate this problem, and the author of the present paper was successful in finding in the township of Ribeirao Preto a certain number of children presenting slight signs of hypertrophy of the thyroid gland. Though the symptoms were not marked and the majority of the children were

attending school and showed normal intelligence, the author was able to infect a guinea-pig from the blood of one of them, 5 to 10 cc. of blood being drawn from a vein for this purpose. After the lapse of 15 days, a small number of living trypanosomes were detected in the blood of the guinea-pig and from its heart's blood fresh inoculations were successfully made into other animals. The author was also successful in growing the parasite from the same blood after 48 hours upon blood-agar made from guinea-pig's blood, while agar made from the blood of rabbits and monkeys remained sterile.

J. B. N.

MALARIA.

VON EZDORF (R. H.). **Malarial Fevers. Prevalence and Geographic Distribution in Arkansas.**—*U.S. Public Health Rep.* 1914. Jan. 2. Vol. 29. No. 1. pp. 1-13. With 2 maps.

This report is issued in response to the rules and regulations adopted by the Arkansas State Board of Health, 1913. Ezdorf's study is based upon such mortality reports as could be collected under reply postal cards addressed to all physicians in the State, obviously a very unsatisfactory method of obtaining accurate information.

Replies were received from all 75 counties, in all of which malaria was said to occur. The month of the greatest incidence appears to be August with a decline during the next two months, the tertian to be the commonest form of the parasite, and *Anopheles maculipennis* to be the most prevalent anopheline mosquito.

P. H. Bahr.

PROPAGANDA ANTIMALARICA. 1913. Oct. 31. Vol. 6. No. 5. pp. 98-120; and Dec. 31. No. 6. pp. 121-160.

These two numbers contain the following original papers:—(i) CELLI: Malaria in Italy during 1911. Experimental and Prophylactic Researches. (ii) ROSSI: Results of an Enquiry into Malaria and the Rural Antimalarial Campaign in the Provinces of Benevento, Caserta and Salerno. (iii) CACACE: Report on Antimalarial Hygienic Measures in Schools, presented to the 7th Italian Pediatric Congress in Bologna and the 1st Congress on Italian School Hygiene in Milan. (iv) RUGE: Difficulties in Quinine Prophylaxis [see this *Bulletin*, Vol. 3, p. 56.] (v) CACACE: Education and Prophylactic Antimalarial Measures in Schools in Italy in 1912. (vi) IBBA: Malaria in the Municipality of Iglesia during 1913. (vii) TARASCONI: Antimalarial School Measures in Serramanna during 1911.

The papers are chiefly of local interest.

P. H. B.

ETTINGER (Witold). **Drei Fälle von Malaria mit ungewöhnlich schweren Symptomen.** [Three Cases of Malaria with Unusually Severe Symptoms.]—*Wien. Klin. Wochenschr.* 1914. Jan. 15. Vol. 27. No. 3. pp. 49-50.

A record of three benign tertian cases presenting certain features' such as icterus and diarrhoea. In two diagnosis was further complicated by the appearance of a rash; in one this was urticarial, affecting especially the eyes, nose and pharynx, in this respect resembling measles; in the other it was multiform and composed of papules, macules and blebs. In the third case the mental stupor, furred tongue and abdominal symptoms suggested a diagnosis of typhoid.

All the cases recovered under appropriate treatment. Ettinger believes the jaundice to be a "retention icterus," itself consequent on hepatic insufficiency and not of haemolytic origin, as he found the resistance of the red cells to dehaemoglobinization to be normal in the laboratory.

[Observations on the plasmodia and the blood cells which are recorded are of little value. The author does not specify what he means to imply by the discovery of "Plasma cells" in the blood. Laboratory tests on the resistance of the blood cells to dehaemoglobinization are quite unnecessary in view of the well known action of the plasmodium itself on these cells.]

P. H. B.

GOODHART (S. Philip). **Amnesias of Tobacco and of Malarial Origin. With Report of Two Cases.**—*Jl. Amer. Med. Assoc.* 1913. Dec. 27. Vol. 61. No. 26. pp. 2297-2301.

The author records a case of tobacco amnesia which he treated, and contrasts the pyschic condition with that of a case of malaria in a young woman as seen by another practitioner. In this case the tertian parasite was found during the acute attack, but for several days preceding the appearance of the parasite and the attack of fever the patient had suffered from mental confusion. The consequent amnesia was continued long after all malarial symptoms had disappeared. The confused mental state was of such marked character as to suggest typhoid to another practitioner. Goodhart discusses whether the pyschic symptoms in this case were directly due to the malarial toxins or to certain changes in the brain capillaries produced by the micro-organism itself.

[The patient, a young woman of twenty-seven, was, as the author admits, of a high-strung and nervous temperament; it therefore appears to the reviewer unwarrantable to suppose a thrombosis of the cerebral capillaries in her case, especially since such complications are more usually associated with the subtertian parasite.]

P. H. B.

GIEMSA (G.) & WERNER (H.). **Erfahrungen mit weiteren dem Chinin nahestehenden Alkaloiden und einigen ihrer Derivate bei Malaria (Chinidin, Hydrochinidin, Cinchonin, Hydrocinchonin, Cuprein, Chinäthylin und Chinpropylin).** [Experiences with Alkaloids allied to Quinine and with its Derivatives in Malaria.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Jan. Vol. 18. No. 1. pp. 12-15.

1. Cuprein in doses of one gramme daily proved to be a good substitute for quinine, but the difficulty and the expense entailed in procuring it prevent its general adoption.

2. Cinchonin and Hydrocinchonin in doses of one gramme daily are practically inert in malaria.

3. Chinidin and Hydrochinidin proved at least equally as effective as quinine.

4. Chinäthylin exhibited quite extraordinary antimalarial properties.

Comparison of the hydrated alkaloids with the simple bases show that the antimalarial properties of the latter are not augmented by the addition of the hydroxyl group.

P. H. B.

SPAGNOLIO (Giuseppe). **Il Tannato di Chinino nella Malaria infantile.** [Quinine Tannate in Infantile Malaria.]—*Malaria e Malat. d. Paesi Caldi.* 1913. Oct.-Dec. Vol. 4. No. 6-7-8. pp. 367-368.

Spagnolio finds that in Messina the administration of quinine tannate to children in place of euquinine has several obvious advantages; it is cheaper, better borne, and more efficacious in the prevention of relapses.

P. H. B.

BAETGE (P.). **Behandlung der Malaria tertiana mit Neosalvarsan.** [Treatment of Tertian Malaria with Neosalvarsan.]—*München. Med. Wochenschr.* 1913. Dec. 16. Vol. 60. No. 50. pp. 2776-2778.

A record of four cases of benign tertian malaria treated successfully with ·9 gm. intravenous injections of neosalvarsan. No further relapses occurred whilst the patients remained under observation.

P. H. B.

WERNER (H.). **Malariarückfälle nach Salvarsanbehandlug.** [Malaria Relapses after Treatment with Salvarsan].—*Arch. f. Schiffs- u. Trop. Hyg.* 1914. Jan. Vol. 18. No. 2. pp. 63-64.

A criticism of SUMMA'S paper reviewed in this *Bulletin* (Vol. 3. p. 148). Werner believes that salvarsan only extirpates malarial infection when given during the acute phase, whereas in the relapses recorded by SUMMA it was injected during the latent period of infection when no malaria parasites were present in the blood. He concludes that a combined quinine and salvarsan therapy promises well.

P. H. B.

DEPPE (L.). **Intravenöse Sublimatinjektionen bei tropischer Malaria mit latenter Sepsis.** [Intravenous Injections of Perchloride of Mercury in Malaria with Latent Sepsis.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1914. Vol. 18. No. 2. pp. 51-53.

In spite of the prolonged use of quinine the temperature of a case of subtertian malaria did not become normal even though the parasites had completely disappeared from the blood. A latent septic focus was therefore suspected, and BACELLI'S sublimate injection, composed of ·01 gramme perchloride of mercury in ten parts normal saline, was injected intravenously. This proved efficient. The patient's temperature soon became normal, but one would feel chary in recommending a more extended use of a remedy producing 73 stools in a period of a week!!

P. H. B.

CARTOLARI (Enrico). **Splenectomia per Milza Malarica, Ipermegalica ed Ectopica.** [Excision of the Hypertrophied and Displaced Spleen in Malaria.]—*Gazz. d. Ospedali e Cliniche.* 1913. Nov. 9. Vol. 34. No. 134. pp. 1399-1402.

A record of the successful removal of a hypertrophied spleen in malaria. The condition of the blood, as evidenced by the rise in haemoglobin and the number of red cells, was much improved by the

operation. There was little change in the character of the differential leucocytic count or in the total number of leucocytes. Apparently further relapses were not prevented by the operation.

P. H. B.

BERTARELLI (Ernesto). **Wenig erörterte Fragen aus dem Gebiete des Malariaschutzes und der Lehre von der Malaria.** [Some little discussed Problems on Malaria and its Prevention.]—*Centralbl. f. Bakt.* 1. Abt. Referate. 1914. Jan. 31. Vol. 60. No. 10. pp. 289-297.

The first problem Bertarelli considers is the question of quinine prophylaxis. Is it better to put the whole population in a malarious district under such a prophylaxis or only that portion of the community harbouring gametes in their blood? He thinks that neither method is feasible, but proposes a compulsory quinine prophylaxis of all who have suffered from fever in the previous three years.

Direct experimental proof of the destruction of the sporozoites by quinine is yet lacking, but the author cites the case of Verona as showing that the general distribution of quinine to sick and healthy alike prevents infection in previously non-infected persons.

Mosquito destruction is the second problem considered. The author suggests an organized attempt to destroy hibernating mosquitoes, as constituting a much more practical measure than the destruction of larvae.

The third problem the author has set himself is whether the malaria parasite exists in other mammals than man, which would account for the difficulty of its eradication in certain districts. CARAZZI has stated that, although malaria spreads with great rapidity in rural areas, it does not do so in towns and suggests that the bat constitutes the reservoir host, even in spite of much experimental evidence to the contrary.

P. H. B.

ROSS (Ronald), CHRISTOPHERS (S. R.) & PERRY (E. L.). **The Spleen Rate in London School Children.**—*Indian Jl. Med. Research.* 1914. Jan. Vol. 1. No. 3. pp. 385-387.

The spleen rate has by universal consent been accepted as the most readily applied measure of the amount of malaria in a community.

Ross in his recent work in Cyprus had suspected that many spleens are "just palpable" in subjects not affected by malaria. The authors determined to set the matter at rest by examining 500 London school children mostly between the ages of three and ten years. The spleen rate was found to be about 1 per cent.

The best method to ensure complete abdominal relaxation is for the observer to be seated, while the child, standing between his knees, leans slightly forward over his knee, at the same time looking upward. The observer's hand can thus be easily passed under the left costal arch. The gist of these observations is that no large error due to the palpation of the normal spleen has to be considered.

P. H. B.

WATSON (Malcolm). **The Prevention of Malaria.**—*Glasgow Med. Jl.* 1914. Feb. Vol. 81. No. 2. pp. 81-88.

This, though less technical than the author's paper in the *Transactions of the Society of Tropical Medicine and Hygiene*, already reviewed (see this *Bulletin* Vol. 3, p. 153) practically traverses the same ground and relates the now familiar history of our modern knowledge of malaria.

[The reviewer may be excused, without in the least degree wishing to minimise the importance of Ross's discovery, if he points out that the author is a little ungenerous in his estimate of MANSON'S work. No one can assert that MANSON'S mosquito-malaria theory was *not correct*; it stipulated for the completion of the life-history of the plasmodium in the mosquito, not the exact manner in which it was conveyed by the mosquito from man to man.]

P. H. B.

ZIEMANN (H.). **Weiteres über die Züchtung der Malariaparasiten und der Piroplasmen (*Piroplasma canis*) in vitro.** [Further Studies on the Cultivation of Malaria Parasites and Piroplasms *in vitro*.] —*Arch. f. Schiffs- u. Trop. Hyg.* 1914. Feb. Vol. 18. No. 3. pp. 77-93. With 1 curve.

The conclusions of this paper may be briefly stated as follows:—

1. No propagation of the parasite takes place in dextrose-free cultures.

2. Multiplication of the parasites proceeds less slowly than in the peripheral blood.

3. Degeneration forms can be found in cultures and resemble those occasionally found in the peripheral blood. Schüffner's dots are produced in the corpuscle by the growth of the benign tertian and Maurer's dots by the subtertian parasite in culture.

4. In accordance with the well-known proclivity to spontaneous recovery in subjects of malarial infection, the parasites tend to die out in some cultures.

[The results do not differ materially from those obtained by other workers on the subject.]

P. H. B.

BLACKWATER FEVER.

BARRATT (J. O. Wakelin) & YORKE (Warrington). **The Production of General Symptoms in Haemoglobinaemia.**—*Brit. Med. Jl.* 1914. Jan. 31. pp. 235-238. With 3 text figs.

The authors advance further evidence in support of the conclusions arrived at from their previous work on the same subject.

Intravenous injection of red cell stromata into rabbits rapidly causes convulsive symptoms and death, whereas a haemoglobin extract seldom gives rise to such symptoms.

The injection of cell stromata results in a delayed coagulability of the blood. This alteration, taken in conjunction with the fact that red cell stromata *in vitro* and in the presence of calcium chloride also act as a coagulant, suggests that the symptoms so produced may be due to the intravascular separation of fibrin, a supposition subsequently borne out in some cases by microscopical examination.

It is not possible to attribute the general symptoms attending injection of red cell stromata to a purely mechanical effect brought about by intravascular production of fibrin, for the amounts so produced are very small, and fibrin cannot be detected in every case of death following injection. Other appearances such as the irregular particles of stromata in the solution used for the injection and the flocculent precipitate caused by the addition of normal saline to such a solution, suggests that the lethal effect is produced by a mechanical obstruction of the pulmonary vessels.

The alternative hypothesis is that the symptoms are toxic in character, due to substances dissolved out of the stromata before injection.

Neither of these hypothesis appears to furnish a satisfactory explanation of the occasional appearance of acute symptoms following upon the injection of solution free from stromata.

P. H. B.

BRUCE-PORTER (H. E. B.). **Intravenous Injections in Blackwater Fever.**—*Practitioner.* 1914. Feb. Vol. 92. No. 2. (No. 548). pp. 261-265. With 2 curves.

A record of a typical case of blackwater fever occurring in an army officer on leave from the West Coast of Africa, and treated successfully by the now well-recognized method of intravenous injections of normal saline and copious saline enemata. The patient had been previously free from malarial attacks for three years, and had no mononuclear leucocytosis. There was no splenic enlargement and no malaria parasites were found in the blood. Quinine, of which only grs. x had been taken after commencement of the attack, could not be regarded as a predisposing factor. The author, apparently on very little evidence, connects the development of the disease with the bite of a tsetse fly received some months previously.

P. H. B.

INSECT TRANSMITTERS OF DISEASE.

SIMPSON (Jas. J.). **Entomological Research in British West Africa. IV. Sierra Leone.**—*Bull. Entomol. Research.* 1913. Nov. Vol. 4. Pt. 3. pp. 151-190. With 5 plates and a map.

This is the fourth of a series of studies of blood-sucking insects in Tropical Africa; the others dealt with the Gambia, Northern Nigeria and Southern Nigeria. The author's visit was paid in March to November 1912. An account is given of the geography of the Colony and Protectorate, the area of which is approximately 32,000 square miles. At Freetown there are several hundred European troops and here native crews are taken up on the outward voyage and dropped on the homeward. There is frequent transport of troops between this port and the West Indies. These data show the importance of Freetown.

In the account of the vegetation the various zones of afforestation are described; it is noted that *G. palpalis* is found chiefly in mangrove forest, fresh-water swamp forest and forest fringing rivers, whereas *G. longipalpis* is restricted to savannah forest, and *G. fusca* to tropical rain forest. Charts are given of temperature, humidity and rainfall. The wet season lasts from May to October; the harmattan blows from December to March. The bulk of the paper is taken up by the account of the author's travels, illustrated by a map. Only a few points of interest can be noted. The author writes of Daru, the headquarters of the Sierra Leone Battalion.—

"Larvae were found in various water-filled depressions in the soil, in hollows in trees, in the receptacle formed by the bases of the leaves of pine-apples, in canoes at the river-side, in pools in the concrete floor of the verandahs of unoccupied houses, and in the bamboo fencing around the gardens kept by the native soldiers. The last-named of these was the most important. Bamboos were used for fencing purposes and no attention was paid to where these were cut; so that in nearly every pole several inches of the terminal internode formed a receptacle for water. In every one of these examined, larvae were found, and in almost every case *S. fasciata* and *S. apicoargentea* were bred out."

At another place larvae of *S. sugens* were found in rock pools at least five miles from a habitation and on a not very frequented road. At Freetown Stegomyia were found, among other places, in the water kept in the barrels used in the blacksmith's shop for cooling red-hot iron. The rôle played by trains in transferring insects from one place to another is illustrated by the fact that since the making of the railway tsetse have appeared in Accra which was previously free. A list is given of the blood-sucking insects and other arthropods found in Sierra Leone and a vocabulary of the native names; the tsetse is known as "folloi" or the "softly-softly biter."

The author writes that practically nothing is known with regard to the species of mosquitoes which transmit malaria in Sierra Leone. [Readers may consult the Report of the visit of ROSS, ANNETT, and AUSTEN to Sierra Leone.* Out of 109 *A. costalis* examined at Freetown the parasites of all three species of human malaria were found in 27. One species, or perhaps two, were found in *A. funestus*.]

* Report of the Malaria Expedition to West Africa, Aug. 1899. *Memoir 2 of the Liverpool School of Tropical Medicine.*

Of sleeping sickness he says—Only one diagnosed case of this disease has been recorded. [He is apparently unaware of the observations of Captain GRATTAN in 1905.* This observer diagnosed 18 cases in Sierra Leone by gland puncture.] Trypanosomiasis of stock, the author writes, is very prevalent but does not seem to cause a heavy mortality. Cattle are found all over the Protectorate and in most places look exceedingly healthy, though *G. palpalis* is widely distributed and *G. longipalpis* is abundant in one district. The genus *Stegomyia* and especially the species *fasciata* occurs at widely separated localities.

Photographs illustrate the native cattle (long horned with no hump), and nature of country and of vegetation.

A. G. B.

HONG KONG. **Report on Special Investigations carried out in the Bacteriological Institute and in the Public Mortuary, Victoria, During the Six Months, January 1st to June 30th, 1913.**—Received in Colonial Office 29 September, 1913.

An interesting fact is brought out in this Report, viz. that the predominating mosquito of Hong Kong is *Stegomyia scutellaris* and not *S. fasciata*, of which one specimen only was found. The former would appear to be the common mosquito of the houses and back-yards of the city of Victoria. *Stegomyia fasciata* is common in the ports of Java and, as there is constant steamship communication between these and Hong Kong, its failure to establish itself in the latter town is interesting. Similarly in Canton CHAN TSUN KUN has examined over 5000 specimens of mosquitoes with a negative result, as regards *Stegomyia fasciata*. The author of the Report is unable to offer any explanation.

G. C. Low.

LEGENDRE (J.). **Note sur les Stegomyias du Tonkin.**—*Bull. Soc. Path. Exot.* 1913. July. Vol. 6. No. 7. pp. 511-513.

The habits of the Tonkin Stegomyias are the same as those of these mosquitoes in Africa and America. They live and shelter in the immediate vicinity of man, in and about his gardens and houses. In the Botanical Garden of Hanoi the larvae and pupae of a Stegomyia [species ?] have also been found in a small hollow situated at the junction of two branches of a tree. [It is not stated in the paper what species the Stegomyia described belong to, this rendering the observations of little value.]

G. C. L.

DRAKE-BROCKMAN (R. E.). **Some Notes on *Stegomyia fasciata* in the Coast Towns of British Somaliland.**—*Jl. London School of Trop. Med.* 1913. Nov. Vol. 2. Pt. 3. pp. 166-169.

Some facts relating to the development of *Stegomyia fasciata* in Somaliland are given. [These do not differ materially from those

Jl. R. Army Med. Corps. 1906. Nov. Vol. 7. p. 485.

which obtain in other parts of the world.] The larvae emerge from the eggs under favourable conditions in from two to three days and pupate in four or five days, though if food is scarce the larval stage may last for three weeks or more. [Four days is a very rapid development even in the presence of abundant food].

Two tables are given, one of a series of experiments conducted with a view to ascertain the length of life of *S. fasciata* when unfed, fed on dates, and lastly on human blood; the second, the time occupied by the different stages in the life history.

G. C. L.

LEGENDRE (J.). **Destruction des Culicines à l'Aide du Gite-piège.**—*Bull. Soc. Path. Exot.* 1913. July. Vol. 6. No. 7. pp. 513-514.

The author refers to a paper by himself,* in which he recommended the destruction of mosquitoes by collecting their eggs from water surfaces specially suitable for them to breed upon. He now gives a table showing the numbers of egg rafts of culex collected from a number of natural sites of this nature, the figures showing that the method is a valuable one for the reduction of domestic mosquitoes. [More might be done on similar lines in and about houses in the Tropics].

G. C. L.

BALFOUR (Andrew). **Ants as Transmitters of Tropical Diseases.** [Correspondence.]—*Lancet.* 1914. Jan. 17. pp. 212.

Reference is made to the work of BATES on the mechanical transmission of *B. typhosus* and *B. dysenteriae* by a species of large ant in the Canal Zone. The author points out that it was DARLING who redirected attention to this question. He then goes on to narrate an interesting observation of his own made in the Sudan. A species of ant there has a great liking for urine, both fluid and dried up. Possibly the urea attracts them. These ants haunt chamber pots and quite possibly might transmit *Micrococcus melitensis* or *B. typhosus* occurring there to food such as milk or cheese. This probably does not often occur, but the possibility should be borne in mind.

G. C. L.

KING (W. V.). **Note on the Mounting of Mosquito Larvae.**—*Amer. Jl. Trop. Diseases & Preventive Med.* 1913. Nov. Vol. 1. No. 5. p. 403.

For killing, hardening and clearing the larvae a solution of equal parts of pure carbolic acid crystals and absolute alcohol is used. Living larvae are placed in a small dish or upon an ordinary slide, excess of water being removed with blotting paper, and then a few drops of the solution are poured upon them. After fifteen to thirty minutes the specimens are ready for mounting, the medium employed being turpentine colophonium. If the larvae have been treated in

* *Bull. Soc. Path. Exot.* 1910. Vol. 3. No. 7. p. 455.

a dish, they are removed to the slide with a pipette which has a fair sized opening, as much of the carbol-alcohol as possible is removed and they are then mounted under a cover slip in the usual manner. The colophonium medium is better than xylol balsam. It is prepared by dissolving small lumps of pale colophonium in rectified oil of turpentine.

The author claims that, by his method, the handling of the specimen is reduced to a minimum, the chitinous parts are cleared sufficiently for examination, and little or no shrinkage takes place in the soft parts of the body or even in such delicate structures as the anal gills. After mounting, the slide should be examined occasionally for several weeks to remedy any shrinkage of the medium which may take place. The author believes that soft bodied arthropods, of which the chitinous parts are to be studied, may be dealt with in a similar manner.

G. C. L.

SNAKE-BITE.

REINHOLD (C. H.). **Case of Snake-Bite.** [Correspondence.]—*Indian Med. Gaz.* 1913. Oct. Vol. 48. No. 10. p. 413.

A case of snake-bite successfully treated with permanganate of potash and ligature.

A woman sleeping on a verandah was bitten on the index finger of the right hand by a krait, which was killed immediately after and subsequently identified by the author. In less than five minutes he incised the wound, rubbed in potassium permanganate crystals and applied two ligatures, one at the root of the finger and another on the wrist. The accident having occurred at night the ligatures were not removed till morning, the patient in the meanwhile suffering a good deal of local pain but with no general symptoms. After the ligatures were removed no further symptoms occurred, and the patient five days afterwards was convalescent with nothing worse than a sloughing wound of the finger.

The author writes that it is impossible to say what would have been the sequel if no treatment had been given, but knowing the virulence of krait venom, and that the specimen killed was three feet seven inches long, he infers that the result would have been serious if not fatal.

G. C. L.

WHITE (P. Carr). **A Case of Cobra Poisoning: Recovery.**—*Indian Med. Gaz.* 1913. Nov. Vol. 48. No. 11. pp. 430-431.

A man aged about 30 was bitten on the back of the forearm by a snake which was caught and identified as a cobra. A bystander instantly applied a very tight ligature to the upper arm and made many free incisions with a sharp razor through the fang marks, which bled copiously. Medical aid arrived one and half hours after the bite, powdered permanganate of potash being then rubbed in. Two hours after the bite, the patient complained so much of the pain caused by the tight ligature that it had to be removed. There were then no symptoms of cobra poisoning. The author believes that the free bleeding caused by the incisions washed out the cobra venom and so saved the man's life.

G. C. L.

WALL (F.). **Treatment of Snake Poisoning.**—*Indian Med. Gaz.* 1913. Nov. Vol. 48. No. 11. pp. 428-430.

The cardinal signs of a snake-poisoned wound are said to be (1) Pain of a burning or stinging character; (2) Swelling; (3) Discharge of blood or bloody serum, the discharge being thin and persisting for many hours. These three signs are usually associated, but the presence of any one of them should leave no doubt as to the injection of venom. The absence of all three justifies the conclusion that the wounds have not been poisoned. The treatment of snake poisoning may be discussed under the following heads:—

(1) Preventive, including (a) medicinal and (b) mechanical.
(2) Antidotal, *i.e.*, Antivenene.
(3) Symptomatic, including drugs that operate on (1) the nervous

system such as ammonia, strychnia, and alcohol and (2) on the circulatory system and blood such as calcium, adrenalin, and pituitrin.

(4) Local, *i.e.*, antisepsis.

As regards drugs various chemical agents such as permanganate of potash, hypochlorite of lime, chloride of gold, nitrate of silver, etc. are known to render snake venom of all kinds innocuous when mixed *in vitro*, but unfortunately *in vivo* it is most difficult to bring any of these agents into chemical relationship with the snake venom, which is locked up tenaciously in the living tissue cells. To achieve the best results, one should bring as large as possible a surface of the poison bearing tissue into relationship with the salt, either by free excision, or by closely set parallel incisions through the swollen tissues. There is no reason to suppose that any drug will prove more satisfactory than potassium permanganate.

As regards antidotal treatment success depends upon:—(1) The freshness of the preparation. It loses 5 to 10 per cent. of its virtue in the first year, and probably more subsequently. (2) The time that has elapsed since the casualty. The shorter the time, the better the chances of success. (3) The method adopted. The intravenous method is the more rapid, and its effects are more pronounced than those of the intramuscular. After paralytic symptoms have appeared this method is imperative. (4) The dose employed. The initial dose should be 100 cc., and this should be repeated at intervals of quarter of an hour so long as symptoms show a "crescendo" movement.

For symptomatic treatment ammonia and alcohol have been employed and, more recently, drugs acting upon the circulatory system such as calcium, adrenalin and pituitrin. The first of these can be given internally in 1 drachm doses every four hours, but its best effects are to be obtained by hypodermic injection of half drachm doses. From experiments recently conducted in Copenhagen on tadpoles it would appear that calcium actually reduces the toxicity of cobra venom. Adrenalin is best administered hypodermically in doses of 10 minims of a 1/1000 solution. Pituitrin also is given hypodermically, the dose being 18 minims. Combinations of these may also be employed.

In every case of snake poisoning syncope is to be expected. It should be looked for and promptly treated; otherwise even anti-venene will not save the subject bitten by cobras and daboias, and the other measures recommended will prove unsuccessful. Wounds however trivial should always receive attention; they are to be laid open and, whether potassium permanganate has been employed or not, should be antiseptically dressed.

G. C. L.

DAY (E. C.). **Report of an Instructive Case of Snake-Bite.**—*Jl. Amer. Med. Assoc.* 1913. Nov. 8. Vol. 61. No. 19. p. 1718.

The patient, a mulatto, aged six, was seen within two minutes of being bitten on the back of the second phalanx of the right middle toe by a "ground-rattler" of the genus *Sistrurus*, family *Crotalidae*. An Esmarch bandage was at once applied around the right thigh, the toe was freely incised with ten incisions, and a large compress of boric acid was applied to the ower half of the foot. Two hours

after the patient vomited. Six hours later the boric pack was removed and the tourniquet taken off. The outer side of the foot was then seen to be slightly swollen and the fourth toe, next to the incised one, was about three times its normal size, was dark in colour, and on its inner aspect presented a circular patch of blue skin, this covering a portion of completely digested tissue. Apparently the snake had struck twice, having bitten the fourth toe first. There were no constitutional effects and no ecchymoses appeared.

[The author does not state the poisonous capacity of the "ground-rattler." One would have thought that a poisonous snake, biting so severely as this one did, would have produced more severe local and general symptoms.]

G. C. L.

Jackson (R. W. H.). **A Case of Snake-Bite.**—*Jl. R. Army Med. Corps.* 1913. Dec. Vol. 21. No. 6. pp. 694-695. With 1 fig.

The patient, a gunner at a battery near Weymouth, was struck by a brown adder on the right thumb, June 30th, 1913. An hour later all the symptoms of acute collapse—slow, sighing, irregular respiration, weak, quick, irregular pulse, temperature 95° F., pallid sweating skin—were present. The hand and forearm were much swollen and intense pains in the upper arm and axilla were complained of. The limb had been tightly bandaged at the wrist, at the elbow, and above at the middle of the upper arm.

Twenty minims of a strong solution of potassium permanganate were injected where the fangs had penetrated and three drams of aromatic spirits of ammonia were given by the mouth.

As the bandages were loosened the symptoms became very urgent, but gradually these subsided and recovery was uneventful, the patient being discharged from hospital on July 24th.

G. C. L.

Stevenson (W. D. H.). **The Preparation of an Antivenomous Serum for the *Echis carinata* or Phoorsa with Notes on the Toxicity and Haemolysing Power of the Venom.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 310-325.

The author states that according to Noguchi eight specific anti-venomous sera have so far been prepared. The list given does not include an *Echis carinata* antivenene, nor does the polyvalent serum now prepared at the Central Research Institute, Kasauli, India, though potent against cobra and the *Daboia russelli*, have any effect on the venom of this snake. As however it is the commonest poisonous snake in India and undoubtedly has caused deaths, the Government of Bombay considered it advisable that an attempt should be made to prepare a curative serum. This is not an easy matter on account of the difficulty of obtaining vipers of sufficient size.

Morison who first undertook the experiment immunised a sheep by means of intravenous injections, the animal receiving as its final dose 166 milligrammes of venom. The animal eventually died but a small quantity of its serum was obtained and tested (Serum of sheep A). A second sheep was immunised by Stevenson and its serum (Serum of sheep B) was examined three times, (1) seven days after the animal

had received 100 milligrammes of venom subcutaneously in a single dose, (2) seven days after it had received 645 milligrammes subcutaneously in a single dose and (3) eight days after it had received 1,000 milligrammes subcutaneously in a single dose.

After intravenous injection of toxic doses of the venom the symptoms leading to death are immediate and death is produced by intravascular clotting as LAMB and HANNA found in the case of Daboia poisoning. A series of experiments with the serum of sheep A and sheep B is given. It is finally pointed out that *in vivo* the haemolytic action of *Echis* venom is negligible, unless injected intravenously in large quantities. FRASER and GUNN have drawn attention to the fact that with even two minimum lethal doses there may be no haemolysis of corpuscles in the circulating blood, though with much smaller doses there is usually complete haemolysis at the site of injection, and they state that haemorrhagic discharges from the alimentary canal, etc., consist largely of unhaemolysed corpuscles. The author's conclusions are as follows :—

(1) The minimum lethal dose of *Echis carinata* venom administered subcutaneously to a guinea-pig may be taken as ·0045 grammes per kilogramme weight.

(2) *Echis carinata* venom, given intravenously to rabbits, is lethal in doses of ·00005 grammes per kilogramme weight.

(3) An antivenomous serum has been prepared with *Echis carinata* venom of which 1·5 c.c. neutralises *in vitro* 50 minimum lethal doses of venom.

(4) The haemolysins present in 0·2 milligrammes of *Echis* venom are neutralised by 0·5 c.c. of the antivenomous serum.

(5) There is evidence of the presence of a small amount of neurotoxin in the venom of *Echis carinata*.

G. C. L.

ACTON (Hugh W.) & KNOWLES (R.). **A New Method of obtaining a Viperine Antiserum.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 326-335.

The subcutaneous inoculation of pure venom into animals in sub-minimal lethal doses invariably gives rise to marked local reaction and, at the same time, causes some constitutional disturbance. From this it results that the doses can only be increased little by little, and that a rapid increase of dose gives rise to either death or severe wasting of the animal's tissues. To obviate this, various experimenters have tried the effect of (1) chemical reagents, and (2) heat, to modify the toxicity of pure venom.

The authors have attempted to secure fixation of the haemorrhagin by adding cells obtained from the lung tissue of healthy rabbits. The result of this has been that the injections of these mixtures have no longer given rise to local gangrene and its concomitant sepsis, whilst, at the same time, the authors have been able to immunise rapidly their animals to as high a titre as has been previously obtained.

The technique employed was as follows :—

One sheep and four goats were selected for immunisation and were weighed. The lungs of a rabbit, freed from all fibrous and tough tissue around the bronchi, were weighed and minced up in a sterile mortar with a scalpel and forceps into fine fragments. They were then pounded into a jelly with a sterile pestle. Normal saline solution was then added in

gradually increasing volumes until a 10 per cent. emulsion by weight of lung tissue was obtained. The solution was twice filtered through coarse muslin in the process.

The Daboia venom for injection was then weighed and dissolved in normal saline solution. For the first five injections, a solution of which 1 c.c.=2 mgms. was used. For the second five injections the strength of the solution used was 1 c.c.=12 mgms.

The venom solution was then mixed with the 10 per cent. lung emulsion in a sterile flask. For the first five injections for every 1 mgm. of venom used 2 c.c. of lung emulsion was added. At the next two injections, 1 c.c. of the 10 per cent. lung emulsion was added to every 1 mgm. of venom. For the last three injections for every 1 mgm. of venom ·5 c.c. of lung emulsion was added. The mixture was then allowed to stand for three hours in the ice chest, and the injections were given the same afternoon.

The animals, with one exception, a goat, stood the injections well. The only local effect of the injections was some slight thickening of the subcutaneous tissues at the site of injection. Constitutional reactions were negligible. Sepsis and local gangrene were markedly absent.

A series of tables give full details of the methods used, the results of the testing of the antivenene ene and its standardization.

The conclusion reached is that the method "appears to provide a rapid and ready way of immunising animals against a viperine venom" and to be one devoid of many of the disadvantages of previous methods.

G. C. L.

Acton (Hugh W.) & Knowles (R.). **The Dose of Venom given in Nature by a Cobra at a Single Bite.**—*Indian Jl. Med. Research.* 1914. Jan. Vol. 1. No. 3. pp. 388-413. With 3 charts.

The following are the author's conclusions :—

"1. The average total venom yielded by an adult, healthy cobra of about 4 feet in length, is equivalent to 272 mgms. of dessicated venom.

"2. The amount which such a cobra injects at a good bite is about 172 mgms.

"3. The residual venom left in the glands after a good bite is about 127 mgms.

"4. From the above conclusions 1 and 2, it follows that a cobra gives, as a rule, as its bite about ten-sixteenths of the total amount of venom in its glands.

"5. Any antidote for cobra bite must be of such a nature that it will neutralize at least 172 mgms. of dessicated venom, half an hour after this dose has been inoculated into the system.

"6. The chances of recovery amongst human beings badly bitten by fresh cobras with full glands are from 3 to 4 per cent., and may become much higher under the circumstances which attend many actual cases of cobra bite."

G. C. L.

Acton (Hugh W.) & Knowles (R.). **The Dose of Venom given in Nature by the *Echis carinata* at a Single Bite.**—*Indian Jl. Med. Research.* 1914. Jan. Vol. 1. No. 3. pp. 414-424. With 2 charts.

The authors, continuing their study upon the bites of poisonous snakes, found as regards the *Echis carinata* :—

"1. The average total venom yielded by an adult fresh Echis of 13½ inches is equivalent to 18·8 mgms. of dried venom.

"2. The amount given at a good bite is about 13·3 mgms.

"3. From the above results it follows that an Echis gives at its first bite about ten-fourteenths of the total venom in its glands; a fraction which agrees fairly well with the ten-sixteenths obtained for the cobra.

"4. There is every prospect that an Echis antivenene of even low potency will almost eliminate the mortality from Echis bite.

"5. As it is, however, even without such an antivenene, the chances of recovery after being badly bitten by an Echis with full glands are about 40 per cent.; and, if other factors are present which would occur in nature but which were absent from our experiments, the chances of recovery may be even higher."

G. C. L.

BARRATT (J. O. WAKELIN). **The Nature of the Coagulant of the Venom of *Echis carinatus*, a Small Indian Viper.**—*Proc. Roy. Soc.* 1913. Oct. 16. Vol. B, 87. No. B 593. pp. 177-190.

In the course of the paper the different action exerted by thrombin and thrombokinase upon circulating blood plasma is described. With a view to throwing additional light upon the problem whether the coagulant action of the viper venom is due to either of these bodies, the action of heated and unheated venom upon circulating blood plasma was investigated. The final conclusions reached are that the coagulant of viper (*Echis carinatus*) venom, as exhibited by its effect in causing intravascular separation of fibrin when injected into the blood stream, and also as indicated by its behaviour when heated, is a thrombin and not a thrombokinase.

G. C. L.

ANDREWS (W. HORNER). **Experiments with Snakes.**—*Union of S. Africa. Dept. of Agriculture. Second Report of the Director of Veterinary Research.* 1912. Oct. pp. 406-483. [1913. Cape Town: Cape Times, Ltd., Govt. Printers.]

The author began collecting snakes in 1911 for the purpose of studying the effects of their bites on the various domesticated animals. They were allowed to bite the experimental animals freely. In some instances it was necessary to irritate them while in other cases all attempts to induce biting proved unavailing. The bitten animal was placed in a loose box and free from all restraint as far as possible. It was observed at short intervals or watched continuously, and all the symptoms were recorded at the time of the observation.

The following is a list of the common South African snakes tested :—

Colubridae.—(1) *Aglypha.*—*Ablabophis rufulus* (Brown Water Snake). *Lamprophis aurora* (the Night Snake). *Boodon lineatus* (the House Snake). *Simocephalus capensis* (three-cornered Snake). *Dasypeltis scabra* (Egg-eater).

(2) *Opisthoglypha.*—*Tarbophis semiannulatus* (Tiger Snake). *Leptodira hotamboeia* (Herald Snake). *Trimerorhinus rhombeatus* (Schaapsteker). *Trimerorhinus tritaeniatus* (Schaapsteker). *Psammophis furcatus* (a Sand Snake). *Dispholidus typus* (the Boomslang).

(3) *Proteroglypha.*—*Naia haie* (Egyptian Cobra). *Naia flava* (Yellow Cobra). *Sepedon haemachates* (Ringhals).

Viperidae.—*Bitis arietans* (Puff Adder). *Causus rhombeatus* (Night Adder).

Lists of the experiments with their results are recorded. The *Dispholidus typus* (the Boomslang) was found capable of delivering a fatal bite to horses, mules, sheep and baboons. The venom is comparatively slow in its action and there may be a prolonged incubation period during which the bitten animal appears to be quite normal. The chief action of the venom is apparently exerted on the vascular endothelium with the consequent causation of numerous small haemorrhages. Experiments with the *Naia haie* (Egyptian Cobra) showed that of eight animals bitten four died, three recovered, and one did not receive sufficient venom to cause any noticeable ill health.

Living snakes of the species *Naia flava* (Cape or Yellow Cobra), which is confined to Cape Colony and German South West Africa, were procured through the kindness of Mr. FITZSIMONS of the Port Elizabeth Museum. They were allowed to bite a horse, a mule and two sheep and in every instance the case terminated fatally.

Experiments were also conducted with the *Viperidae*. Of the ten species of this family recorded from different parts of South Africa only two species, *Bitis arietans* and *Causus rhombeatus*, were available for experiment. The former were allowed to bite a horse, a mule, a donkey, three sheep and a dog, and of these seven animals only the mule recovered.

Specimens of the Night Adder were procured from Mr. FITZSIMONS and were allowed to bite one horse, which developed a slight local reaction only, two sheep, of which one died and the other recovered, and one dog which recovered.

Bitis arietans is evidently highly dangerous to equines, sheep and dogs; the absolute toxicity of the venom may possibly prove not to be very high as compared with that of some other species, but the poison glands are well developed and the volume of venom available for ejection is generally very considerable.

Causus rhombeatus is popularly considered to be extremely venomous, but this view is not supported by the experiments recorded. Out of four cases only one death occurred. FITZSIMONS, as a result of biting experiments on rabbits and fowls, has also concluded that this species is not very dangerous to life.

[Those interested in the subject should consult the original and also FITZSIMONS' book on the snakes of South Africa, an abstract of which was given in this *Bulletin* Vol. 1, p. 412.]

G. C. L.

MYIASIS.

Rieley (S. D.) & Howlett (F. M.). **A Few Observations on Myiasis (Screw-Worm Disease) in Behar.**—*Indian Med. Gaz.* 1914. Jan. Vol. 49. No. 1. pp. 8-10. With 1 temperature chart.

A form of myiasis due to a blue-bottle fly, *Pycnosoma*, is described. This fly deposits its larvae in slight abrasions or on the unbroken mucous membrane of the nasal fossa of the patient. The larvae burrow into the delicate membrane and feed on the underlying structures, causing considerable destruction of tissue with occasionally severe constitutional symptoms. The patient has a characteristic appearance. The upper portion of the face is oedematous, the oedema being localised chiefly to the nose, eyes, lower part of the forehead and upper lip. The voice is described as nasal and breathing is mostly through the mouth. The patient complains of an intense burning and gnawing pain in the affected parts. There is severe frontal headache and a rise of temperature to 100° or 103° F.

A local examination shows the mucous membrane of the nose to be congested, swollen and deeply ulcerated, and clinging to this larvae more or less fully developed may be seen. From the bases of the ulcers sinuses lead in various directions into the underlying tissues. A sanious foul-smelling discharge dribbles away from the nose or may flow into the mouth and be expectorated by the patient. The larvae may pass up the nasal duct and emerge through the conjunctiva, or attack the frontal bone and make their way into the frontal sinuses. From here they may penetrate the skull and cause death from meningitis.

Howlett, who describes the fly under the name of *Pycnosoma flaviceps*, states that at present there is a slight doubt as to the correctness of the identification owing to the absence of a really good specimen for comparison. It is probably viviparous, as no traces of egg or egg shells have been discovered, such a condition being common, according to the author, among those flies whose larvae feed on decaying animal matter.

[This fly is said to resemble *Chrysomyia*, but the three dark stripes on the dorsum of the thorax are wanting. The term "Screw-worm" up to the present has usually been applied to the larvae of *Chrysomyia macellaria*.]

G. C. L.

De Pássos Maia (Domiciano). **Casos de Myases Intestinaes.** [Cases of Intestinal Myiasis.]—*Revista Med. de S. Paulo.* 1913. June 30. Vol. 16. No. 12. pp. 223-226.

The author describes a hitherto unrecognized form of intestinal myiasis, supposed to be due to a coleopterous insect.

In the province of Minas, especially on the banks of the Rio Grande, cases of a peculiar kind occur which the common people ascribe to witchcraft. The affection begins with febrile attacks like those of ague, at comparatively distant intervals such as three months to a month. In the attack the three stages of rigor, fever and sweating may be distinguished just as in malaria, with the addition of attacks

of an epileptiform nature. The liver and spleen are never enlarged. The access generally lasts about 48 hours and is best treated by the administration of a purgative, quinine and arsenic having no effect. The effect of the purge is to expel a large number of insect larvae from the bowel along with a few perfect insects of Coleopterous type about half a centimetre in length, as to the identity of which the author cannot speak with certainty from want of the necessary technical knowledge. Samples of the material in question have, however, been sent to the Oswaldo Cruz Institute for examination and report.

J. B. Nias.

Wohl (Michael G.). **Myiasis, or Fly Larvae as Parasites of Man. With Report of a Case.**—*New York Med. Jl.* 1913. Nov. 22. Vol. 98. No. 21. pp. 1018-1020.

Cases dealing with Sarcophaga [flesh fly] infections are given. The larvae of these flies are not uncommonly found in the Tropics in ulcers or in syphilitic erosions of the nose and even in the ears. A series of seven cases of such infections is given.

The author's own case was especially interesting because it was one of what may be termed myiasis interna sarcophagidae, all the other collected cases having been external ones. The following is the record: A young man was suddenly seized by abdominal pain followed by profuse diarrhoea. An examination of the stools showed about a dozen small larvae. Some of these were fed on meat and in the course of twelve days became transformed into flies which were identified by Cresson as the *Sarcophaga sarraciniae*, Riley. After treatment by santonin and calomel no more larvae were expelled and since that time there has been no further indications of the infection. The stages of transformation were as follows:—Larva, September 22nd; pupa, September 27th; Fly, October 4th.

[The author's description of his case does not seem to exclude the possibility of the fly having deposited its eggs upon the faeces after they were passed. Such flies commonly do so and one must therefore be specially careful not to be misled by such an occurrence].

G. C. L.

Knab (Frederick). **The Life-History of Dermatobia Hominis.**—*Amer. Jl. Trop. Dis. & Preventive Med.* 1913. Dec. Vol. 1. No. 6. pp. 464-467.

The author discusses the recently published observations of the manner in which the *Dermatobia cyaniventris* disposes of its eggs. Surcouf's paper is specially referred to (see this *Bulletin* Vol. 2. p. 527). To the data presented there the author adds another observation recently communicated to him by Professor Urich of Trinidad. In 1905 the latter found *Janthinosoma* [species not stated] with eggs attached in the manner described by Surcouf. These mosquitoes were sent to the Bureau of Entomology in Washington at the time, but no satisfactory explanation was offered nor was the significance of the eggs suspected. Unfortunately the specimens cannot now be found.

Two theories are put forward as to how the eggs become fastened to the mosquito, MORALES of Costa Rica believing that the fly deposits them there herself, while RINCONES asserts (see this *Bulletin* Vol. 2, p. 528) that the eggs are laid upon foliage and thence reach the mosquito. Knab believes that there are a number of strong reasons why the explanation of SURCOUF and RINCONES cannot be accepted. First the eggs are found attached to a part of the mosquito's body which does not come in contact with the leaf surface when she rests upon it; *Janthinosoma* rests with the body well elevated upon its long legs. Secondly the eggs are attached in a definite way, by their bases and with the hatching end outward. This would hardly be the case if the eggs were picked up accidentally by the mosquito. Thirdly, were the eggs laid upon the surface of leaves, they would be much more likely to become attached to other insects, such as would not bring about their transfer to a suitable host. This last objection is strengthened by the fact that mosquitoes are not ambulatory insects, but on the contrary move about as little as possible when not on the wing.

The evidence, then, points rather to a definite instinct on the part of the mother *Dermatobia* to seek out the mosquito as the vector for her progeny. That the mosquito in every case observed has been a *Janthinosoma* is in itself significant. It is of further interest that this mosquito is hardly separable generically from *Psorophora*, which is believed by the natives of Tehauntepec to be the parent of the *Dermatobia* larva. The facts point very definitely to a complex and precise adjustment of the fly to the parasitic habit. The idea that the eggs of the fly are scattered by her promiscuously and picked up haphazard by other insects seems to the author impossible. On the other hand, the claim that the fly captures the mosquito and attaches the eggs to her needs verification.

The author concludes by hoping that reliable observers will soon determine beyond doubt the facts in connection with what promises to be one of the most remarkable of the many strange inter-relations occurring in connection with parasitism.

[Knab has evidently not seen ZEPEDA'S paper on the same subject. Readers should refer to the abstract of this published in this *Bulletin*, *loc. cit.*]

G. C. L.

LINGUATULIDA INFECTIONS.

MACFIE (J. W. Scott) & JOHNSTON (J. E. L.). **A Note on Five Cases of Porocephaliasis in Man from Southern Nigeria.**—*Lancet.* 1913. Nov. 15. pp. 1387-1389. With 1 text-fig.

Reference is made to papers by SAMBON and LOEHLEIN [see this *Bulletin*, Vol. 1, pp. 403 and 405]. Five cases are now described from Southern Nigeria, one each at Ibadan, Calabar, and Itu and two at Degama. The larvae from four of the cases were apparently those of *Porocephalus armillatus*, but those from the fifth seemed slightly different, being smaller and with their rings, which were broad and band-like, more closely set together. This however may have been due to the larvae being in an immature condition.

The pathological conditions which may be brought about by the parasites are discussed. LOEHLEIN believes that they are harmless, but CHALMERS thinks that they set up inflammatory changes in the lungs and peritoneum. In the first two cases recorded by the authors sufficient evidence of disease was found at the autopsies to account for death, without attributing any action to the presence of the larvae. Cases 3, 4 and 5 (these were recorded by Dr. WILSON) suggest, however, that the larvae may set up serious pathological conditions. No definite cause of death was discovered at the post mortem examinations and WILSON himself considered that the fatal termination in each case had been at any rate accelerated by the presence of the larvae. These three cases presented a peculiar clinical picture and the conditions found after death were somewhat similar. The chief symptoms were progressive weakness, oedema and dyspnoea without any very definite signs to account for the physical conditions. WALDOW in Kamerun has described a case which died with symptoms of meningitis; cysts containing calcified porocephali were present in the liver, omentum, mesentery, and pleura. [See also this *Bulletin*, *loc. cit.*]

[Further details of this parasite and the lesions it produces should prove useful. Considering the frequency with which it is met with on the West Coast of Africa these should be easily obtained.]

G. C. L.

MOUCHET (R.). **Notes Anatomiques et Médicales sur la Pathologie du Moyen Congo.**—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Oct. Vol. 17. No. 19. pp. 657-669. [Porocephalus. pp. 668-669.]

Porocephalus infections are common amongst the indigenous natives around Leopoldville in the Middle Congo. Mouchet has found larval forms in more than 20 per cent. of the autopsies which he has performed. The parasites were found in the peritoneum, in the different organs of of the abdominal cavity, and especially in the liver. There would seem to be reason for supposing that infections with this parasite have recently become more common because BRODEN and RODHAIN, who worked out its complete cycle and published interesting monographs on the subject in 1908 and 1909, stated then that the parasite was very rare at Leopoldville.

G. C. L.

Gomes de Faria & Travassos (Lauro). **Beobachtung der Larve von *Linguatula serrata* Froelich als Darmparasit des Menschen in Brasilien und Bemerkungen über die Linguatuliden der Instituts-sammlung.** [Observation on the Larva of *Linguatula serrata* Froelich as an Intestinal Parasite of Man in Brazil and Remarks on the *Linguatulida* in the Institute's Collection.]—*Mem. Inst. Oswaldo Cruz.* 1913. Vol. 5. No. 2. pp. 123-127.

A case of human infection with the larva of *Linguatula serrata* is described [*Linguatula* Frölich 1789 is one of the four genera of the *Linguatulida*, the other three being *Porocephalus* Humboldt 1811, *Reighardia* Ward 1899 and *Raillietiella* Sambon 1909. Only the first two contain species parasitic in man].

The parasite was found in the intestine during an autopsy on a case of ankylostomiasis. It had the form of a flattened worm, was of a white colour, and of a length of about 4 mm. by 0·9 mm. in breadth. Microscopically it showed the typical structure of *L. serrata*, being furnished with 86 rings.

Such larvae have been found in man in Europe by Heschl, Virchow and others and in Central America by Darling and Clark. They chiefly occur in the lungs, more rarely in the liver, spleen and intestines. The adult parasites, though normally parasites of the nasal cavities of dogs and other carnivorous animals, have also been found in man. The nymphal stage which develops from the larva and resembles the adult has been called *Pentastoma denticulatum*.

Two other species of *Linguatula* are mentioned by the authors, viz. *Linguatula recurvata* Dies. 1836 from the right heart of *Dicotyles labiatus* [peccary] and *L. subtriquetra* Dies. 1836 from *Caiman sclerops*.

G. C. L.

RAT-BITE FEVER.

DICK (Mitchell Innes) & RUTHERFURD (W. J.). **A Case of the So-called Rat-Bite Disease.**—*Brit. Med. Jl.* 1913. Dec. 20. pp. 1580–1581.

The authors report a case from England [locality not stated] of what they believe to be rat-bite disease acquired apart from bite by a rat. They suggest calling the disease by its Japanese name, wrongly calling it "Sokodu." [The Japanese name is "Sodoku."] They believe that other diseases can be conveyed by rat-bites, notably septic conditions and tuberculosis. The case on which the authors' paper is based is as follows :—

A man, aged 33, after a day's work during which he felt well, early in July 1913, was seized with slight pain in the splenic region. Shortly after he had a rigor, and about three hours later sweated profusely. After eight days of fair health he had a similar attack, and seven days afterwards, on July 20th, another. His clothing was then wringing with sweat, his tongue furred, the pulse 120, and the temperature 100·4° F., though as he had by this time reached the sweating stage he was probably defervescing. The next day he seemed quite well again. Five days later he again had an attack of the same sort, followed this time by a fairly severe urticarial eruption; a further attack occurred on July 26th, and another—the sixth—on August 2nd. Subsequently he had a few slight rigors and sweats, with nothing like the severity of the major attacks, and each one less than the one before; these occurred up to September 30th, on which date, however, he was looking very well and fit. Between these seizures he appeared in good health, and examination revealed only the presence of a very slight haemic murmur over the cardiac area.

Quinine and acetyl-salicylic acid were given, but neither of these drugs seemed to exert any control over the course of the disease, which lasted for over ten weeks and gradually died away of its own accord.

[It is by no means clear that the case was one of rat-bite fever, however closely the symptoms suggest it.]

G. C. L.

NICHOLSON (Frank). **A Further Case of Rat-Bite Disease.**—*The Practitioner.* 1913. Sept. Vol. 91. No. 3. (No. 543.) pp. 429–430.

The patientwas a boy of ten living in North Lincolnshire and had been bitten by a rat on the left side of the hand six weeks before the symptoms developed. The bite had been only a trifling one and no attention was paid to it at first. The symptoms at the onset suggested septicaemia. A few patches of urticaria appeared on the legs, body and face, and there was some swelling of the back of the hand and up the arm to rather above the elbow with erythema. No pus formed. The temperature remained high for three months but finally the patient recovered.

G. C. L.

SURVEYOR (N. F.). **A Case of Rat-Bite Fever treated with Neosalvarsan.**—*Lancet.* 1913. Dec. 20. pp. 1764–1765.

A somewhat extraordinary case of this disease, seen in Bombay, the history being that the patient, a Hindoo lady, had been bitten on the right ear by a rat eight years previously. Attacks of fever lasting from three to seven days accompanied by urticarial eruptions on different parts of the body, especially the face, persisted over all these years in spite of treatment with quinine, arsenic, iron and mercury. After each attack the patient was left weaker and lost flesh and became very anaemic. When first seen by the author the appearance suggested Bright's disease, as the face was puffy, there was oedema of the extremities and marked anaemia. The roseolar wheals were the most characteristic feature of the fever.

As the patient's condition was getting worse an intramuscular injection of neosalvarsan, 0·7 gramme, was given, the temperature being 97°. After this for about a week the temperature varied between 99° and 102°, while there was severe pain at the site of the injection which was moderately swollen. Later the temperature came down to normal and remained so for a fortnight. After another month a little rise occurred, but since then the fever has disappeared and the patient has been putting on weight and getting stronger daily.

[This would seem to be an exceptionally chronic case of rat-bite disease. HATA (this *Bulletin*, Vol. 1, p. 407) describes eight cases treated satisfactorily with salvarsan. This would seem to suggest that the causal organism may be a spirochaete or an organism closely related to this group. It is just possible that it is a filterable virus.]

G. C. L.

MISCELLANEOUS.

BARBER (Marshall). **An Unusual Disease Prevailing in Epidemic Form at Buhi, Ambos Camarines, P. I.**—*Philippine Jl. of Science.* Sect. B., Trop. Med. 1913. Oct. Vol. 8. No. 5. pp. 369-372.

An epidemic of a peculiar disease is described. The symptom common to all the cases was swelling, often but not always painful, usually rather diffuse, but in some cases well defined and varying from a small lump to a tumour the size of half an orange. The swellings did not occur in the joints nor in the inguinal and axillary glands, but on the hands, arms, feet, legs below the knee, thigh and face. There was no pus formation as a rule unless surgical or cauterizing remedies had been applied. In about half the cases the starting point was described as a pimple, while in one it resembled an ant bite. In five or six of the cases an extremity, usually a finger, was first affected with subsequent extensions up the arm or leg. Three cases showed a vesicular eruption over the lesion.

The only positive laboratory findings were pyogenic cocci, and it is possible that many of the milder and perhaps of the fatal cases were due to pyogenic infection. The fact that the disease often began at a definite point in the skin, sometimes a minor lesion, and extended from there would support this view. Against a pyogenic infection however, is the fact of the disease taking on an epidemic form, but the people in whom it occurred may have had their resistance lowered by hardships of various sorts.

G. C. L.

VERGNE (R.). **"Espasmo Tropical": A Peculiar Disease of Great Malignancy, associated with a Parasite in the Blood.**—*Jl. Trop. Med. & Hyg.* 1914. Jan. 15. Vol. 17. No. 2. pp. 20-21.

The name is given to a disease occurring in Porto Rico. According to the author it appears in two different forms—form "A" which may be benign or malignant, form "B" a typhus-like type. In the benign form of "A" the patient has trismus. In the malignant form in addition to this symptom there is a marked typhoid stage—high temperature, muttering delirium, weak and rapid pulse, vomiting of a dark greenish material; death supervenes in almost all the cases in two or three days.

Form "B" is always malignant. An eruption appears in the majority of cases localised to the abdominal region, small dark spots with raised edges which do not disappear on pressure. After the third day they turn to a red colour, and later to a bluish colour. There is high temperature, weak and rapid pulse, and complications such as bronchopneumonia, and acute endocarditis may appear. The author believes he has seen a parasite in the blood in these cases.

[The second form of the disease would appear to resemble ordinary typhus very closely; the author's parasite cannot be taken seriously.]

G. C. L.

RODENWALDT (Ernst). **Kryptogenetische Muskelabszesse in den Tropen.** [Muscle Abscesses of Obscure Origin in the Tropics.]—*Arch. f. Schiffs-u. Trop. Hyg.* 1914. Jan. Vol. 18. No. 2. pp. 41-50.

Reference is made to muscle abscesses occurring in the Tropics. Such conditions are frequent and have been described by many observers, notably by KUELZ, [see this *Bulletin* Vol. 2, p. 92] and ZIEMANN [*loc. cit.* p. 422]. The author points out that in Togo they cannot be due to *Filaria loa* because that parasite is not really endemic in Togo, cases only occurring there in people who have resided in Kamerun. He also believes that, if these muscle abscesses are really due to filariae, they would be much more frequent than they are. For example, he only saw 16 cases of myositis purulenta amongst 600–800 men, of whom 50 per cent. were infected with *Filaria perstans* and *Onchocerca volvulus*. Very careful examinations of the pus in his cases failed to show any signs of the remains of worms. He therefore considers that the disease is one *sui generis*.

[*Filaria bancrofti* has usually been associated with such abscesses, not *F. loa*, *perstans* nor *Onchocerca volvulus*. This point does not appear to have been studied in the paper, but it is quite possible, as the author says, that some of these abscesses may be non-filarial.]

G. C. L.

LESK (R.). **Einiges über Erkrankungen der Gallenwege und Leber. Ein tropenchirurgischer Beitrag.** [Observations on Diseases of the Bile-Duct and Liver. A Contribution to Tropical Surgery.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 3. pp. 386-415.

The author discusses the subject of infective inflammation of the gall-ducts and gall-bladder and the conditions arising therefrom. He quotes several cases from his own practice where symptoms resembling peritonitis led to laparotomy, but at the operation nothing was found except an enlarged liver and a little bile-stained fluid in the peritoneal cavity. He recommends the performance of cholecystotomy in such cases instead of simple closure of the abdominal wound, as the bile will generally be found to be infected with coli-form organisms. These conditions of infective hepatitis, so common in the tropics, are apt to be masked by secondary symptoms such as pulmonary congestion, or nephritis with anuria, so that a routine examination of the region of the liver should never be omitted in dealing with patients in the tropics presenting such symptoms; otherwise the primary focus of disease may be overlooked. [The author's style is rather diffuse owing to his profuse quotation of authorities, but in spite of this the paper will repay perusal by those interested in the subject.]

J. B. N.

RAVENHILL (T. H.). **Some Experiences of Mountain Sickness in the Andes.**—*Jl. Trop. Med. & Hyg.* 1913. Oct. 15. Vol. 16. No. 20. pp. 313-320.

Mountain Sickness, known as Puna in Bolivia and as Soroche in Peru, is common in the mountainous districts of the Andes. Ravenhill

gives the following symptoms as occurring in puna of a normal type. The majority of newcomers express themselves as being quite well on first arrival. As a rule, however, towards the evening the patient begins to feel rather slack and disinclined for exertion. He goes to bed, but has a restless and troubled night, and wakes up next morning with a severe frontal headache. There may be vomiting, frequently there is a sense of oppression in the chest, but there is rarely any respiratory distress or alteration in the normal rate of breathing so long as the patient is at rest. He may feel slightly giddy on rising from bed, and any attempt at exertion increases the headache, which is nearly always confined to the frontal region.

On examination the face may be slightly cyanosed; the eyes look dull and heavy, the tongue is furred. The pulse is nearly always high, being generally in the neighbourhood of 100 or over. The temperature is normal or slightly less. The patient feels cold and shivery. The headache increases towards evening, so also does the pulse-rate; all appetite is lost, and the patient wishes to be left alone—to sleep if possible. Generally, during the second night he is able to do so, and as a rule wakes next morning feeling better; the pulse-rate has probably dropped to about 90; and the headache is only slight. As the day draws on he probably feels worse again, the symptoms all tending to reappear on any exertion; if, however, he keeps to his bed, by the fourth day after arrival he is probable very much better, and at the end of a week is quite fit again. The most prominent feature in this type of puna is frontal headache and extreme lassitude.

In addition to this normal type cardiac and nervous types are described. In the former the symptoms are those of an acute heart condition coming on in a perfectly healthy man. Dyspnoea appears, the pulse is hardly perceptible, the lips and ears are cyanosed and the heart sounds are very weak. The patient then may pass into an unconscious condition and quickly die. In one case, presenting symptoms such as the above, removal to a lower altitude resulted in the disappearance of the symptoms and recovery.

In the nervous type the simplest form consists of a nervous excitation and buoyancy, which has been described as a sense of being lifted into the air by a balloon. It may precede an attack of the ordinary type. There may be a tendency to twitching of the lips and trembling of the limbs. Generally it passes off but the nervous symptoms may develop to such a degree as to become alarming. In these severe forms delirium may come on with convulsions and loss of memory. Vertigo is also a prominent symptom.

As regards vomiting and epistaxis, these vary; the former occurred in about half the cases, was never serious and soon passed off; the latter occurred only in about 20 per cent. of the cases and was hardly ever very profuse. Many other interesting observations upon the condition are given in the paper, viz., the influence of alcohol, muscular work, tobacco, sex and age, and effects of slow or rapid ascent.

The treatment of the normal type of puna resolves itself into rest in bed with the windows well open, and at least a day of quiet after all symptoms have disappeared. Aspirin in doses of 1 gramme to begin with, and 0·5 grammes for four hours afterwards quickly relieves the headache. Phenacetin does not act so well, nor are inhalations of oxygen of much effect. In severe cases removal to lower altitudes is

essential. The fact of a man having lived in the altitudes safely does not mean that he is immune from their effects when he revisits them. A table analysing 38 cases is given and a series of red blood cell counts is appended.

G. C. L.

STEVENSON (Sinclair E.). **Splenomegaly.**—*Brit. Med. Jl.* 1913. Oct. 4. pp. 847-849.

A description of a case of splenomegaly in a girl in South Africa. The treatment adopted was removal of the spleen. The patient recovered rapidly from the shock of the operation and three days later had made considerable improvement. The patient was alive twelve days after, but further progress is not stated. Careful examination of the organ after removal showed no signs of micro-organisms.

[Cases of splenomegaly of such a nature are frequently found in the Tropics apart from any question of leishmaniasis. They have been described in Egypt, the Philippines, etc. Their etiology is uncertain. So far no parasites have been found in them. Whether they are the same as the cases of splenomegaly occurring in England and Europe is not known.]

G. C. L.

CASTELLANI (Aldo). **Further Observations on the Fungi of the Genus Endomyces found in Man.**—*Arch. de Parasitologie.* 1913. July 10. Vol. 16. No. 2. pp. 184-186.

The author believes that the classification of the Endomyces cannot be based purel upon morphology as used to be done in the past, but that the gar reactions should be studied, as well as the action on milk, gel e, serum, etc. Biological tests should also be used where possib . The Endomyces he has studied have been isolated mostly from cases of bronchomycosis and thrush, also from saliva and stools of cases of chronic intestinal diseases (sprue, etc.), as well as from other diseases and from normal individuals. He has studied an Endomyces is lated from the air, and several isolated from tea. It is concluded that a plurality of species of this genus is observed in man. 19 species, in addition to *Endomyces albicans*, having been so far isol ed by the author: 13 species from sputum, bronchial expectoration, rush lesions, otomycosis; six from stools, scrapings from the intest nes, etc. Besides these 19 species from man, four new species have been isolated from tea and one from air. The 24 new species of Endomyces can be easily differentiated by their sugar reactions and their action upon milk, gelatine and serum.

A table giving the cultural reaction of the various species mentioned is appended.

G. C. L.

KOPP (Karl). **Zur Frage des Bevölkerungsrückganges in Neupommern.** [The Decrease in Population in New Pomerania.]—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Nov. Vol. 17. No. 21. pp. 729-750. With 1 text fig.

The author discusses the cause of the reduction in the number of the

native population which is going on in New Pomerania, an island in the Bismarck Archipelago, east of New Guinea. His observations relate more especially to the northern coast of the island. He states that the children are born healthy and in sufficient number, the proportion of children under 15 years of age to adults being higher than in most European countries, but that the adult native is not long lived and the mortality among the women is high owing to the hard work to which they are put. He attributes the decline not to the importation of European diseases, such as syphilis and tuberculosis, as commonly thought, but to the prevalence of endemic tropical diseases, the general hygienic conditions of the natives being decidedly bad. The diseases enumerated and discussed by the author are syphilis, yaws, malaria, tuberculosis, leprosy, filariasis, ankylostomiasis and other worm infections, dysentery, beriberi, ulcerative stomatitis, smallpox and skin diseases. Of these malaria does much harm. Ankylostomiasis is very common. He suggests that natives of the north coast, who clinically are strongly suspect of tuberculosis but give negative tuberculin reactions, may be suffering from the *Paragonimus westermani*. No examinations of the sputum for the eggs of this parasite are, however, reported. Beriberi is only found in imported workers who live on rice; it is rare among the indigenous natives. Smallpox, introduced in 1890 from the Dutch Indies, caused a heavy mortality, and many natives even now bear the scars of the disease on their faces.

With regard to the measures necessary to check the decrease in population the author thinks that a great need is the provision of proper water supplies, in order to reduce the prevalence of worm disease, and the teaching of more civilised manners with regard to the disposal of excreta is also urgent. As there are no white settlers on the coast in question instruction in these matters falls to the lot of the medical man.

As to the exact amount of depopulation going on, it is difficult to form a correct opinion, from the impossibility of making a complete census of the natives, but there seems to be no doubt that their numbers are diminishing, which the author thinks a very serious matter for the future of the colony.

G. C. L.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 6.

HELMINTHIASIS.

JOUVEAU-DUBREUIL (H.). **Helminthiase Intestinale et Hépatique dans la Population Chinoise de Tchentou (Setchouen, Chine Occidentale).** —*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 704-708.

The stools of five hundred adult Chinamen at Tchentou were examined during a period of eighteen months with the following results :—

Ascaris	86·6 per cent.
Trichocephalus	41·0 „ „
Ankylostomes	14·2 „ „
Oxyuris	9·4 „ „

Only 17, *i.e.* 3·5 per cent. were free from infection; 48·6 per cent. had one species, 39·8 harboured two forms and 8·17 had still more. In spite of systematic search no eggs of trematodes or cestodes were found.

R. T. Leiper.

ALESSANDRINI (Giulio). **Sul Potere battericida dei Vermi intestinali.**— Volume "*In Onore del Professore Angelo Celli nel 25º Anno di Insegnamento.*" 1913. Turin: Unione Tipografico Editrice Torinese, pp. 259-276.

From the experiments reported in this paper the author thinks the following conclusions may be drawn :

1. Extracts of several helminths exercise *in vitro* bactericidal action on many pathogenic germs.
2. Not all the extracts of the worms show equal bactericidal action in the same period of time ; some show it more (*Taenia* and *Strongylus*), others less (*Giganthorhynchus*, etc.).
3. The bactericidal action varies with the variety of germ.
4. The germ which shows itself least resistant is *B. anthracis*.
5. The bactericidal action of the extracts of worms seems to manifest itself equally on living germs in the digestive tube of experimental animals.
6. The parasites in the intestines exercise also bactericidal action on living germs in the same intestine.

A. G. B

(C21) Wt.2413/35—22.12.13. 2,000. 3.14. B.&F.Ltd. G11/4. A

LEGER (Marcel) & SAUVET (Ch.). **Helminthiase intestinale de la Guadeloupe.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 71-75.

The stools of 158 recruits from Guadeloupe were examined at Marseilles by the authors. A table showing the localities whence these came and the numbers infected with the three common intestinal parasites, ascaris, ankylostomes and trichocephalus is given :—

Locality.	Examined.	Parasitised.	Ascaris.	Ankylostome.	Trichocephalus.
Grand-Terre.					
Pointe-à-Pitre ..	37	37	18	23	35
Abymes.. ..	11	11	3	10	10
Gosier	10	10	4	7	6
Sainte-Anne ..	16	16	4	16	15
Saint-François ..	3	3	—	1	3
Moule	16	14	4	12	12
Anse Bertrand..	3	3	2	—	1
Port-Louis ..	3	3	1	3	1
Petit Canal ..	2	2	—	1	2
Morne à l'eau ..	15	15	9	10	11
Guadeloupe proper.					
Petit Bourg ..	7	7	4	6	6
Baie Mahault ..	6	6	1	5	6
Capesterre ..	5	5	3	1	2
Sainte-Rose ..	9	9	3	6	5
Dependencies.					
Marie-Galante ..	13	13	5	5	12
Saint-Martin ..	1	1	1	1	1
Désirade ..	1	1	—	1	1
	158	156	62	108	129

No eggs of taenia nor oxyuris were encountered.

G. C. Low.

TREMATODE INFECTIONS.

SAMBUC (E.) & BAUJEAN (R.). i. **Distomatose hépatique et pancréatique.**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1913. Oct. Vol. 4. No. 8. p. 413.

ii. **Un Cas de Cachexie aqueuse chez l'Homme (Distomatose hépato-pancréatique, avec Syndrome pseudo-béribérique.)**—*Ibid.* No. 9. pp. 425-429.

i. The case of a native who exhibited an enormous number of flukes, *Clonorchis sinensis*, in the biliary and pancreatic ducts, and presented during life the symptoms of beriberi with ascites, is described. The number of parasites approximately reached 21,000, this number being calculated in the following manner: 70 flukes weighed about 1 gm. while the total mass recovered, roughly speaking, weighed 300 gm. A large number of parasites were lost at the autopsy, so that if these are also taken into account the infection must have been a gigantic one.

ii. A detailed description of the case. At the autopsy the body was extremely emaciated. There was oedema of the feet, the abdomen was prominent, and serous fluid was found in the peritoneal and pleural cavities. The liver weighed 1,120 gm. and was absolutely crammed with flukes. The hepatic tissue was pale and cirrhotic. The pancreas also contained large numbers.

The symptoms presented by the patient were similar to those of the malady in sheep known as *cachexie aqueuse*, a form of pernicious anaemia set up by the presence of the *Fasciola hepatica* in the liver.

This case is the second one of pancreatic distomiasis in Tonkin, the first being described by Sambuc. (*Bull. Soc. Méd.-Chirurg. de l'Indochine*, 1911, No. 3.)

G. C. L.

NICOLL (William). **The Trematode Parasites of North Queensland. I.**—*Parasitology.* 1914. Jan. Vol 6. No. 4. pp. 333-350. With 2 plates.

In this article, which deals with a number of new trematode parasites of vertebrates, pride of place is given to brief descriptions of *Clonorchis sinensis* and *Fasciolopsis*. The material was presented by Dr. STRANGMAN of Port Darwin, but its origin is unknown. [There seems no evidence at the present time which might lead one to conclude that these forms were acquired in Australia.]

R. T. L.

LARA (Abelardo). **Hemoptisis endemica de los Paises tropicales.** [The Endemic Haemoptysis of Tropical Countries.]—*Rev. Med. de Yucatan.* 1913. Nov. Vol. 9. No. 1. pp. 1-5.

An account of two cases of pulmonary haemorrhage due to the action of *Distoma pulmonum* (*Paragonimus westermani*).

The disease is endemic in Yucatan, and begins as a rule by the onset of rigors, fever, cough and pain in the chest. This is followed in a few days by the expectoration of a copious blood-stained sputum, so that the symptoms resemble those of an attack of acute pulmonary phthisis. The microscope however shows, instead of tubercle bacilli, the presence of numerous ova of the parasite. These are capsulated, yellow in colour and have an operculum at one end. The course of the disease is chronic and the chief danger to life seems to consist in a liability to cerebral embolism. The two cases narrated quickly recovered, at any rate for the time, on a treatment consisting of dry cupping to the chest, and the use of the following pills :—

Sulphate of quinine	1·5 grammes.
Extract of ergot	1·0 gramme.
Extract of opium	0·10 gramme.

Make into ten pills, of which one should be taken every three hours.

The author has seen five other similar cases of a slighter kind, which he was not able to follow up so completely. The parasite probably finds an entrance to the body through drinking water.

J. B. N.

YOKOGAWA (S.). **Ueber einen neuen Parasiten *Metagonimus Yokogawai*, der die Forellenart *Plecoglossus altivelis* (Temminck) zum Zwischenwirt hat. Bildung einer neuen Gattung.** [On a new Parasite *Metagonimus yokogawai* with a Trout, *P. altivelis*, as Intermediate Host: a new Genus established.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Dec. 16. Vol. 72. No. 3. pp. 158-179. With 3 plates.

In this paper Yokogawa gives a valuable detailed and illustrated account of the structure and life history of a small trematode found by him to be common in man in Formosa, Japan, and later in Corea. The worm is morphologically similar to Heterophyes and Tocotrema. At first named *Heterophyes yokogawai* by KATSURADA it is now placed by the latter in a new genus, *Metagonimus*. The parasites live on the mucous membrane of the small intestine and sometimes penetrate its surface. The cercarial stage occurs chiefly in the fish *Plecoglossus altivelis*, seldom in *Crassius* and in *Cyprinus*. The development of the adults is very rapid. Within 7 to 10 days of the advent of the encysted larva in the duodenum eggs appear in the faeces. These eggs are thick-shelled and of a yellow-brown colour. The posterior end of the egg has a knob-like thickening. Thymol and naphthalin but not santonin are anthelmintic. The larvae are killed at 100° C. but withstand lower temperatures. Infection follows upon the consumption of raw freshwater fish. The first or molluscan intermediate host does not yet appear to be known.

[It is not clear from the text if the name *Metagonimus* is now published as a generic name for the first time, or if it has appeared in the transactions or other publication of the Zoological Institute of the University of Tokio, whose authority for the creation of the new genus is quoted.] R. T. L.

LEGER (Marcel). **Les Porteurs de Bilharzies (*Schistosomum mansoni*) à la Guadeloupe.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 75-78.

The first case of schistosomiasis contracted with certainty in Guadeloupe was described by MATHIS and BAUJEAN in 1910.* The patient suffered from pseudo-dysentery. A second case was reported by COURTOIS-SUFFIT, GAY & JACQUET in 1912.† The author at Marseilles examined the faeces of 158 young soldiers from Guadeloupe and in 16 found the eggs of bilharzia. In most cases they were not numerous, one or two being found in each preparation. They were always laterally spined, the so-called *Schistosoma mansoni*. No terminal spined eggs nor *S. japonicum* eggs were ever seen. The cases came from different parts of the colony, from Grande Terre and Guadeloupe proper and the dependencies (Marie Galante). Schistosomiasis is also common in Martinique, Noc having found *S. mansoni* 37 times out of 225 patients suffering from gastro-intestinal troubles. As in Guadeloupe the bilharziasis of Martinique is never genito-urinary but always rectal. The author's conclusions are that Guadeloupe constitutes an important focus of intestinal bilharziasis, laterally spined eggs alone existing, and that a tenth at least of the young population harbour the parasite. G. C. L.

**Bull. Soc. Méd. Chirurg de l'Indochine*, 1910. Vol. 1. p. 174.
†*Bull. Soc. Méd. des Hôpit. Paris*, 1912, May 16. See also this *Bulletin*, Vol. 1, p. 103.

MILTON (Frank). **Does Bilharzia (Schistosomiasis) exist in India?**—*Indian Med. Gaz.* 1914. Jan. Vol. 49. No. 1. pp. 10-14.

It is suggested that an infection with bilharzia might explain the urinary fistula and vesical calculus described in the case "A surgical curiosity" recorded in the *Indian Medical Gazette* for October 1913. However, an examination of the literature has revealed only six cases of bilharzia in man in India and of these the majority were imported. Attention is drawn to two cases reported by WARDROP in 1906, in whom the disease developed about six months after arrival in India from England. This was the first time they had left England. In only one case is there clear evidence of infection of a native who had never been out of India.

R. T. L.

ARCHIBALD (R. G.). **Intestinal Schistosomiasis in the Sudan. With Notes on the Treatment of Two Cases by means of Autogenous Vaccines of Coli-like Organisms.**—*Brit. Med. Jl.* 1914. Feb. 7 pp. 297-299. With 4 charts.

Certain cases of "pyrexia with uncertain origin" met with in the Sudan are undoubtedly dependent upon an infection with intestinal schistosomiasis. The patients are usually well nourished adults with fever, headache, furred tongue and enlarged spleen. Diarrhoea and tenesmus are frequently absent; malaria and allied blood infections are indeterminable from blood examination. There is a varying degree of leucocytosis in which the polymorphonuclear leucocytes and large lymphocytes participate. The diagnosis of helminthic infection is masked by the *absence of eosinophilia*. Often eggs are absent from the faeces. In one of the cases there was an extremely rapid enlargement of the spleen. From this was obtained a bacillus resembling an organism previously isolated from the faeces in a case of intestinal schistosomiasis. This suggests that the enlargement of liver and spleen, which are fairly constant features, may be dependent not only on the absorption of helminth toxin, but also on intestinal micro-organisms and their toxins absorbed from the abraded walls of the gut. In such cases vaccine therapy should prove a feasible line of treatment, particularly in the toxic type, and in two cases in which it was tried the results favour an extended investigation. The author regards the absence of eosinophilia in a proportion of the cases of intestinal schistosomiasis, as contrasted with its constant and high rate (40 per cent.) in urinary infection, as a possible differential character between *S. haematobium* and *S. mansoni*. [The common occurrence of typical *S. haematobium* eggs in intestinal cases is apparently overlooked].

R. T. L.

MIYAIRI (K.) & SUZUKI (M.). [**On the Development of *Schistosoma japonicum.***]—*Tokyo Medical Jl.* (Tokyo iji-shinstu). 1913. Sept. No. 1836. [In Japanese].

The authors noticed that when ox faeces which contains the eggs of *Schistosoma japonicum* is kept for one or two hours in a suitable temperature, mixed with water, the majority of the miracidia come

out, breaking the shell, and swim about very vivaciously. They noticed, also, that in the infected locality there are many snails in the waterways or ditches. Of these snails a great many cercaria parasitise one which has a dark coloured shell with seven spirals. The authors carefully picked up a number of young non-infected [?] snails and tried whether the miracidia enter their bodies or not. They found that the miracidium enters the body of the snail, penetrating the cuticle with the lips and proceeds to the gills (?) and the walls of the digestive canals. After twelve days the first rediae appear and gradually concentrate to the hepatic ducts, elongating, and a number of the second rediae are seen. The authors put mice into the vessel, in which the full grown snails were fed, for three hours every day and repeated this experiment for four days. After three weeks they found a great many *Schistosoma japonicum* in the livers of the mice. The authors conclude that this kind of snail is an intermediate host of *Schistosoma japonicum*.

M. Kumagawa.*

KATSURADA (F.). **Schistosomiasis japonica.**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Dec. 31. Vol. 72. No. 4 5. pp. 363-379. With 2 plates and 2 figs.

During the ten years that have now elapsed since Katsurada discovered the *Schistosoma japonicum* as a parasite causing disease in man and domesticated animals many new facts have come to light regarding its structure and life history. These are now summarised by the distinguished discoverer. The males may reach a length of 22·5 mm., the females 26 mm. thus surpassing the *Schistosoma haematobium*. A ripe female may however be only 5 mm. long. The union of the gut branches takes place much further back in the body of *S. japonicum* than in *S. haematobium*, and the united gut in the female is much thicker. From experiment it is found that worms reach maturity in about a fortnight and produce eggs within three weeks. After a month the stools of the experimental animals were bloody and contained mucus in which eggs were numerous. Skin infection has been demonstrated experimentally by Katsurada on cats and dogs, by FUJINAMI on cattle and by MATSURA upon himself. This takes place apparently from spring to autumn. In a footnote it is stated that MIYAIRI of Kiushu has obtained a reproductive stage of the *Schistosoma japonicum* in a species of Limnaeus (see above). The paper concludes with a bibliography of 31 articles on Asiatic schistosomiasis, all of which receive brief but adequate review in the text.

R. T. L.

WHITE (H.). **A Case of Schistosomiasis japonica.**—*Lancet.* 1914. Jan. 17. pp. 172-173.

A case of this disease occurred on H.M.S. "Cadmus" in the Yangtse River in the spring of 1913. Eosinophilia 56 per cent., temperature 103·4° F., pulse 90. There was very slight epigastric tenderness.

*Fleet Surgeon Kumagawa of the Naval Medical College, Tokio, has kindly undertaken to summarise suitable papers published in Japanese.

Ova of *S. japonicum* appeared in the stools one week after the onset of the symptoms. The temperature continued of septic type, ranging from subnormal in the morning to beyond 102° F. in the evening. The patient steadily lost weight. The blood count showed a variation from 50 per cent. to 70 per cent. eosinophiles.

The author appears to regard oral infection as probable.

R. T. L.

Taeniasis.

McCulloch (Hugh). **Notes on Cestode Monstrosities. With a Report of a New Case of *Taenia saginata* with Y-shaped Proglottides.**—*Amer. Jl. of Trop. Diseases & Prevent. Med.* 1913. Dec. Vol. 1. No. 6. pp. 453-461. With 2 text-figs.

An interesting account of monstrosities met with in tape worms is given and a case of *T. saginata* with Y shaped proglottides is described. Such abnormalities occur rather frequently, the more common consisting of defective or unusual formation of the segments, unusual locations of the genital pores or the genital apparatus, or a marked asymmetry in the branching of the uterus. Abnormalities have also been noted where the line of division between segments on one side of the worm does not coincide with the same line on the opposite side and examples of rudimentary segments, found on one lateral border and not extending all the way to the other side, have been noted.

A series of sketches shows some peculiar Y shaped segments pictured by Küchel, Vigener, Bork and Jelden from similar cases. The segments found in the author's case very closely resemble those illustrated by Vigener.

G. C. L.

Railliet (G.). **Un Cas de Bothriocéphalose observé en France.**—*Bulls. et Mém. Soc. Méd. des Hôpit. de Paris.* 1913. Dec. 4. 3 Ser. 29-e Année. No. 35. pp. 717-720.

The worm was found in a pregnant female 38 years of age, who was not anaemic but suffered from diarrhoea. She had lived in the north-east of France and in the environs of Paris only. Treatment with the ethereal extract of male fern was successful in causing the expulsion of the worm.

G. C. L.

Johnston (T. H.). **Notes on some Entozoa.**—*Proc. Roy. Soc. Queensland.* 1913. Vol. 24. pp. 63-91. With 5 plates.

The cysticercoid stages of *Hymenolepis murina* and *Hymenolepis diminuta* are frequently found in the fleas *Xenopsylla cheopis* and *Ceratophyllus fasciatus* in Australia. Usually only one is found in each flea but as many as nine cysts of *H. murina* have been counted. Three cysticercoids of *H. murina* were also obtained from a single *X. cheopis* off *Mus decumanus.*

R. T. L.

ANKYLOSTOMIASIS.

BRYSON (A. Carruthers). **Ankylostomiasis.**—*China Med. Jl.* 1913. Nov. Vol. 27. No. 6. pp. 363-369.

The discovery by the author that a large proportion of the miners working in Chiaotso, Honan, are infected with ankylostomiasis, is of importance in view of the development of China's mineral wealth in the near future. Eight members of the foreign staff of these mines were found to be infected. The condition known as "bunches" amongst Cornish miners was often met with. In foreigners these usually occurred on the back of the neck and other unprotected parts. Ova of ankylostomes were seen in the stools some weeks after these bunches had occurred. Eosinophilia, up to 60 per cent., was characteristic of the early phases of the disease, dwindling latterly. Of Filix mas, thymol, tannate of pelletierine, sulphur, eucalyptus oil and chloroform mixture, beta-naphthol, the last named proved the most satisfactory for routine purposes. To the problem of prophylaxis the author makes a contribution of practical importance. He recommends that for the collection of faeces underground a liberal supply of pails be installed. Each contains water to the depth of four or five inches and enough "skip" oil (*i.e.* "fuel oil" or "road oil"—the first distillate from petroleum) is added to cover the surface. This keeps away flies. The pails are collected and run to the surface in coal tubs, thence they pass on to a large destructor, are emptied and thereafter sterilised by steam. The oil and coal dust, which is added after each defaecation, ensure that the contents of the buckets are readily burnt.

R. T. L.

WOODS (F. L.). **Hookworm in South China.**
AUBREY (G. E.). **Notes on 400 Treatment Cases.** 1913. Hongkong.

In September 1912 the American Government insisted that all immigrants to the United States must be examined for hook-worm and be refused if suffering from this disease. This led to the investigation in Hong Kong of a large number of Chinese who were about to embark for the States. The work proved difficult on account of attempts at deception. Duplicate certificates and photographs proved of great value in dealing with the Oriental in all classes of emigration work.

The percentage of hookworm infection was 48·1 per cent. (767 in 1,592 cases) in males and 32·8 per cent. (65 out of 198 persons) in females. The outstanding physical signs were anaemia, stunted growth and mental sluggishness.

The town Sun Ning supplied the greatest number of examinations and the percentage from this district was 56·3 per cent. The inhabitants of the whole province of Kwang Tung seemed infected to the extent of from 30 to 60 per cent.

The following table shows the relative degree of infection in various classes of the people :—

(*a*) Students	.. .. ..	59·6 per cent.
(*b*) Merchants	.. .. ..	36·0 „ „
(*c*) Housewives	.. .. ..	34·1 „ „
(*d*) Labourers	.. .. ..	24·5 „ „

A separate series of 150 labourers shows a very much heavier infection, viz. 80–90 per cent.

In treating the above cases Dr. Aubrey emphasises the following points: (*a*) the treatment was voluntary; (*b*) starvation before treatment was impracticable; (*c*) all were unaccustomed to alcohol and could stand large doses of thymol; (*d*) a complete cure had to be effected rapidly. The most satisfactory course of treatment under these circumstances is as follows:—

Patient admitted at 2 p.m., discharged at 4 p.m. on the succeeding day, during which time only rice water and tea were given.

On admission R Mist. Sennae Co. ℥ ii.
Pulv. Rhei Co. ℥ i.

At 6 a.m. next morning half an oz. of sodium sulphate in hot water is given; at 7 a.m. 40 grs. of thymol in a cachet, at 9 a.m. 20 grs. of thymol in suspension and at 11 a.m. 20 grs. thymol in suspension. At midday 1 tablespoonful of sodium sulphate in hot water with 1 drachm of brandy.

The second course of treatment is the same as the first, but the amount of brandy is increased by one drachm.

The third treatment is by the eucalyptus-chloroform mixture (Oleum Eucalypti ℥ xxx, chloroform ℥i, Ol. Ricini ℥x). As in the first treatment senna mixture is given on the previous day. Then at 6 a.m. one tablespoonful of sodium sulphate is given in hot water followed by eucalyptus mixture in the following dosage: At 7 a.m. 4 drachms, at 9 a.m. 3 drachms, and at 11 a.m. 3 drachms.

A cure was effected after one treatment in 52·25 per cent. of the cases and in 20 per cent. after two courses of treatment. The Ankylostomes, especially females, appeared more difficult to dislodge than the Necators.

R. T. L.

WATANOBE (R.). [*Necator americanus* is found in Japan.]—*Tokyo Medical Jl.* (Tokyo iji-shinstu). 1913. July. Nos. 1820, 1824. [In Japanese.]

Among the seamen of the Sasebo naval barrack the author found five cases of *Necator americanus*. They were all newly recruited young men from Kiushiu Island, and had not left the barrack, so they must have been brought the worms from their homes. The author continued a careful research and found seven more cases in the same barrack. All these men were recruited from Kiushiu Island (South Western Island of Japan).

M. Kumagawa.

LANE (Clayton). **Ankylostomes and Ankylostomiasis in Bengal.**—*Indian Med. Gaz.* 1913. Nov. Vol. 48. No. 11. pp. 417-423. With 4 plates.

Written at the request of the Inspector General of Prisons, Bengal, this admirable paper summarises the noteworthy points in recent work relating to the diagnosis and treatment of ankylostome infections. Although anklyostomiasis is reported to be a great scourge in some parts of India, it is comparatively rare in Bengal. In the cases treated by

Lane the average number of worms passed was 17·5, while in a recent anti-hookworm campaign in America it was over 1,000. Necator and Ancylostoma occurred in 150 cases in Berhampore in nearly equal numbers, while there were 14 cases of infection with *Ancylostoma ceylanicum*, which has recently been recorded in man for the first time by the author. The total number of worms recovered from these 14 cases was 20, which suggests that *A. ceylanicum* is an occasional and probably abnormal parasite in man. Lane regards the possibility of infection in a jail as non-existent and is of opinion that the whole question of the prevention of infection is merely a matter of simple hygiene such as is obligatory in a jail. Under such circumstances a natural cure will ensue, provided the sentences are long enough.

Two plates with 24 figures illustrate the characteristics of *N. americanus*, *A. duodenale*, *A. ceylanicum*, and *O. vermicularis* and their eggs.

R. T. L.

DA COSTA (Bernardo Bruto). **Breves Palavras sôbre a Anquilostomiase em S. Tomé.** [Brief Remarks on Ankylostomiasis at San Thomé. — *Arquivos de Higiene e Patologia Exoticas.* 1913. Oct. 31. Vol. 4. pp. 119-180.

An account of the measures taken to combat ankylostomiasis in the island of San Thomé. It is estimated that 50 per cent. of the plantation workers on the island are infected with *Ankylostoma duodenale*, and the resulting incapacity for work, apart from actual mortality, is a serious hindrance to the prosperity of the colony. Systematic measures are accordingly being taken to cope with this evil under the author's superintendence as director of the bacteriological institute of San Thomé. The paper commences with an account of the natural history of the parasite and the symptoms caused by it, containing nothing novel, and the author then passes on to a consideration of the various methods of treatment. Preference is given to a mixture of ethereal oil of male fern and thymol, of each 2–4 grammes, santonin 1 decigramme, and calomel 6 to 8 decigrammes, made into 6 boluses, *secundum artem*, to be taken successively, after fasting, at intervals of 10 minutes. The dose is to be repeated on the following day. With this prescription a greater percentage of complete successes were obtained than with any other; namely 58 per cent. of the cases treated. In addition the systematic microscopic examination of the stools of all plantation workers is recommended. Elementary instruction of the native in the ordinary details of cleanliness, in the way of washing the hands before eating and so on, should also form part of the plantation doctor's routine. The greater part of the paper is occupied by the relation of cases submitted to comparative methods of treatment.

J. B. Nias.

OSTROM (Hjalmar). **Ankylostomiasis in Ikoko.**—*Congo News Letter.* Ikoko. 1913.

In this out-of-the-way publication is given the following interesting table of the degree of helminthic infection of natives in a hitherto

uninvestigated part of the Congo.

No. of persons examined	124	
No. with ankylostome ova	107	86 per cent.
,, ,, strongyloides	23	18 ,, ,,
,, ,, ascaris	71	57 ,, ,,
,, ,, whipworm	93	75 ,, ,,

The parasites occurred only in small numbers. The author states that "as the natives do not use human excreta as a fertilizer the chances of infection through the feet are minimised."

R. T. L.

DE ALMEIDA (A. Ozorio). **Campanha contra a Ankylostomiase no Estado do Rio de Janeiro.** [The Campaign against Ankylostomiasis in the State of Rio de Janeiro.]—*Revista Med. de S. Paulo.* 1913. Jan. 31. Vol. 16. No. 2. pp. 27-32.

It is estimated that of the whole population of the State of Rio de Janeiro in Brazil, amounting to about one million persons, not less than 80 per cent. are affected with ankylostomiasis or other allied worm infections of the alimentary canal, the effect on the health and strength of the population being disastrous, especially in rural districts. To cope with this evil a public medical service was created by the State in the year 1911, at the head of which the author was placed. Between 400 and 500 medical posts were formed, from which the inhabitants could obtain a gratuitous supply of the requisite medicines, along with printed instructions and information, the anthelmintic drug selected for the purpose being beta-naphthol, of which 33 centigrammes are combined in a tabloid with 7 centigrammes of phenolphthalein, as a purgative. Machinery was set up in a central depôt for the manufacture of these tabloids, on a wholesale scale. It has been found by experience that preliminary purgation of the patients can be dispensed with, which greatly contributes to the simplicity of the treatment. Although the arrangements have only been in operation for about nine months the results in ameliorating the general health of the population promise to be most satisfactory. Reference is made to what has already been done in the same direction in Costa Rica and the Philippines.

J. B. N.

CAVALLONE (Giovanni). **L'Anchilostomiasi in Desana.** [Ankylostomiasis in Desana.]—*Gazz. d. Ospedali e d. Cliniche.* 1913. Dec. 11. Vol. 34. No. 148. pp. 1551-1552.

The author's observations were made upon 285 cases of ankylostomiasis, of which 254 were from Desana (Piedmont), 31 from its vicinity. The types of person infected were the peasants and others whose occupations brought them into frequent contact with the earth. Persons of all ages harboured the parasites.

More females were attacked than males, 192 of the former to 93 of the latter, or 67·37 per cent. to 32·63 per cent. In the majority of the cases anaemia was seen, some shewing this symptom in an intense form. Detailed particulars are given of a few of the cases.

For treatment small doses of filix mas were given for a considerable time, the author believing that by this method the drug would act not only locally on the intestine but, by being absorbed, generally on the development of the parasites.

G. C. L.

NICOLL (William). **The Blood Volume in Ankylostomiasis. With some Biological Notes relating to the Disease.**—*Jl. of Hygiene.* 1914. Jan. 19. Vol. 13. No. 4. pp. 369-392.

In this paper are given the details of experiments performed upon dogs with *Ankylostoma caninum*, the general conclusions of which were summarised in this *Bulletin*, Vol. 1, p. 436. The anaemia in dogs does not appear to be exactly analogous to that in man. The volume and oxygen capacity of the blood are not materially altered, but if anything are diminished somewhat. Eosinophilia was not a constant sign of infection nor of disease. The appearance of large numbers of erythroblasts indicated blood regeneration and this increased with the course of the disease.

R. T. L.

ASCARIDIASIS.

SWELLENGREBEL (N. H.). **Ontwikkeling van Ascaris-embryonen buiten het Menschelijk Lichaam.** [The Development of Ascaris Embryos outside the Human Body.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 5. pp. 672-674. With 1 plate.

It is well-known that the eggs of *Ascaris lumbricoides*, when kept in water, undergo development. As a general rule the worms remain inside the capsules, and only emerge after entering the stomach.

On one occasion, the author was able to keep the eggs of *Ascaris lumbricoides* for as long a period as three months in water, by taking the precaution of washing them repeatedly with water and then centrifuging, so as to get rid of all bacteria and putrefactive material. In this way the eggs can be kept clean and separate, and samples taken for examination under the microscope. In one of several tubes containing ova so treated, the author was able to watch the liberation of the worms from their capsules and their movements in the water. As this observation is new it is put on record.

The following changes take place. The ova gradually lose their external rugosities except at the two poles. The worm is completely developed at the end of the second, or the beginning of the third month; it then begins a series of butting movements against the interior of the capsule. Eventually the capsule ruptures and the tail of the worm emerges, while the head remains for some time within the shell. This is illustrated. The body of the worm at this stage is nearly transparent and the mouth is without papillae. After it is completely liberated, the worm develops further. The oral papillae appear and a line become visible down the anterior third of the body, indicating the lumen of the oesophagus. The hinder end of the body gradually becomes opaque with granules, and the tail becomes thicker. The worm is now capable of progressive movement, but does not seem altogether at ease in its surroundings, as its wrigglings are slow and

resemble those of *Strongyloides stercoralis*. The life of these liberated worms is short, and the author does not know whether to regard their emergence as normal or abnormal. If it does not take place by the end of the third month, in water, the worms gradually perish within their shells.

J. B. N.

VERVOORT (H.). **Oleum chenopodii anthelmintici, een Wormmiddel tegen Ankylostomum en Ascaris.** [Oleum chenopodii anthelmintici, as a Vermifuge against Ankylostoma and Ascaris.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 3. pp. 435-445.

The author, having a large number of coolies under his supervision, instituted an extensive series of tests to ascertain the merits of American wormseed-oil (*Chenopodium anthelminticum*) in comparison with thymol, oil of eucalyptus and other anthelmintics. The remedy had been suggested by SCHUEFFNER in the preceding volume of *Geneesk. Tijdschrift*. The dose is from 16 to 20 drops given fractionally on sugar within the space of two hours, followed three hours later by 17 grammes of castor oil along with three grammes of chloroform, the bowels having been previously cleared with Carlsbad salts. Later on the chloroform was omitted. The remedy was compared in its action with 2 gramme doses of thymol similarly administered, and so on with the other drugs tried, and an attempt is made to express the results according to an elaborate system of percentage, for details of which reference must be made to the original paper.

The practical conclusion is that wormseed oil is a good anthelmintic, rather more expensive than thymol, but having the advantage that it can be given in capsules, which saves time in the administration. As it is doubtful whether the oil does more than stupefy the worms, it seems advisable to follow this anthelmintic by a purge.*

J. B. N.

VICKERY (D. Hadden). **Intestinal Obstruction due to a Coil of Worms.** —*Brit. Med. Jl.* 1913. Dec. 13. p. 1534.

The author describes a case of what he believes to be intestinal obstruction due to a coil of worms. The patient, a young married woman, was taken suddenly ill with severe abdominal pain and vomiting, during which a large round worm was brought up. Santonin, gr. 5 in castor oil, was then given, and later, during a severe bout of vomiting, a large mass of some 12 large worms was ejected from the stomach; the vomiting then ceased. Pregnancy complicated the case. A few hours after the ejection of the worms delivery of a six months' foetus took place. The patient made a good recovery.

G. C. L.

* "*Chenopodium anthelminticum*, Linné (*Chenopodiaceae*). Contains a Volatile Oil, Official in U.S. *Average dose*, 3 minims. For round worms, 10 minims on sugar or in emulsion has also been tried with good results giving 0·25 to 0·5 gram in sugar and water, and following this in an hour or two with a dose of castor oil. The treatment may be repeated after a day's interval. The fresh plant contains chenopodine, an alkaloid."—*Extra Pharmacopœia*. MARTINDALE & WESTCOTT. Vol. 1. 15th Edition, p. 809.

ENERNAO (Togliani). **Sopra un Caso di Morte causata da Ascaridi.** [On a Case of Death caused by Ascarides.]—*Policlinico.* Sez. prat. 1914. Feb. 1. Vol. 21. No. 5. pp. 163.

A child of about ten years, after the administration of an anthelmintic by its parents, was seized with abdominal pain and vomited up many *Ascaris lumbricoides*. When the author saw the case, a condition somewhat resembling typhoid was present. Pains continued and a tumefaction appeared under and to the left of the umbilicus.

The patient was then removed to hospital and, signs of obstruction persisting, the abdomen was opened. At the lower part of the ileum two large masses of ascaris were found and, as these could not be moved down, the intestine was opened and the parasites were removed.

The condition of the child did not improve, and after the vomiting of more worms by the mouth death took place the day following the operation. At the autopsy the sutures of the bowel were found to be in a good state and there were no signs of peritonitis. Many ascaris were present in the stomach, a few only in the intestine, these occurring in small isolated groups. The question of the parasite having a toxic as well as a mechanical action on its host is referred to.

G. C. L.

POUMAYRAC. **Lombricose à Forme Grave.** [Clinique d'Outre Mer.]—*Ann. d'Hyg. et Méd. Colon.* 1913. July-August-Sept. Vol. 16. No. 3. pp. 783-784.

An Annamite, 26 years of age, was admitted into hospital in a comatose condition. His parents stated that he had had severe fever accompanied by epigastric pains and convulsions so violent that it was impossible to keep him in bed. Two injections of quinine (25 centigrammes) and one of caffeine were given and under the influence of this the temperature came down. Epigastric pain however continued with vomiting, and on the following morning severe convulsions again took place. During further vomiting a very large *Ascaris lumbricoides* was expelled by the mouth. The author thereupon gave santonin followed by a castor-oil purge, with the result that 33 samples of this worm were passed per rectum. A further dose of santonin resulted in the expulsion of eight more and after that convalescence was quickly established.

G. C. L.

PFLUGRADT (R.). **Askariden in den Gallenwegen.** [Ascarides in the Bile Ducts.]—*Deut. Med. Wochenschr.* 1914. Jan. 29. Vol. 40. No. 5. pp. 227-228.

A description of another case of ascaridiasis, parasites being found in the bile ducts. The patient, a woman of 67, had suffered for six or seven years from pains in the region of the liver with jaundice. The abdomen was explored and the gall bladder opened and drained. On the morning of the third day a round worm escaped from the opening. The administration of ol. chenopodii by the mouth

resulted in the expulsion of six worms in the faeces, while another was removed from the gall bladder. Finally the fistulous opening leading from the gall bladder was operated upon and closed, the patient making a good recovery.

G. C. L.

TIRUMURTI (T. S.). **The Vagrant Habits of *Ascaris lumbricoides* with the Report of a Case of Interest.**—*Jl. Trop. Med. & Hyg.* 1913. Dec. 15. Vol. 16. No. 24. pp. 379-380.

Attention is drawn to the wandering habits of the *Ascaris lumbricoides*. Normally living in the jejunum and upper part of the ileum, the parasite may wander to different parts of the intestinal tract, stomach, mouth and anus. Here it gives rise to no very serious trouble. In other instances it has passed into the larynx from the oesophagus, causing asphyxia and death. In others it has set up diffuse suppurative peritonitis by its escape through the intestine into the peritoneal cavity. Liver abscesses have also been caused by the parasites passing up into that organ, but such cases are rare. Passage into the appendix has given rise to verminous appendicitis.

The author describes the autopsy of a poorly nourished girl in which the bile duct had five round worms distending it, while many had travelled up the smaller bile ducts, one of them very nearly to the dome of the right lobe of the liver. These were found by chance, the patient having died of kala azar.

G. C. L.

OHIRA (T.). *Strongyloides stercoralis* **and its Pathogenicity.**—*Jl. of the Soc. of Med. Science of Tokyo.* 1913. Nov. Vol. 27. No. 21. [In Japanese.]

The author having described the details of the life history of *Strongyloides stercoralis* concludes after many experiments :—

1. *Strongyloides stercoralis* is often found in Japan, especially in the southern provinces.

2. Where *S. stercoralis* parasites are present the health of the infected person suffers.

3. Nematodes like *S. stercoralis* are parasitic on both animal and vegetable life, and very often live free. Investigators must pay attention to this point.

4. The diagnosis must be made only with fresh faeces. In the case of examination of old faeces care must be taken to differentiate from Ankylostoma.

5. *S. stercoralis* oviposit in the intestinal wall and sometimes eggs may appear in the faeces. In such a case, if the embryo is found at the same time, one can differentiate them from Ankylostoma very easily.

M. Kumagawa.

PELLAGRA.

LAVINDER (C. H.). **Pellagra in Mississippi. Its Reported Prevalence and Geographic Distribution.**—*U.S. Public Health Reps.* 1913. Oct. 3. Vol. 28. No. 40. pp. 2035-2038.

A record shewing the number of cases of pellagra occurring in the different counties of the State of Mississippi during the first six months of 1913, together with the number of deaths due to the disease from November 1912 to June 1913. The following are the figures :—

Race.	Cases.	Deaths.	
	Jan. to June (incl.) 1913.	Jan. to June (incl.) 1913.	For Nov. & Dec. 1912.
White	648	74	27
Coloured	665	194	51
Total ..	1313	268	78

H. MacLean.

MACDONALD (J. B.). **Notes on Pellagra in Massachusetts, with Report of Two Cases in Danvers State Hospital.**—*Boston Med. & Surg. Jl.* 1913. Oct. 16. Vol. 169. No. 16. pp. 567-571. With 2 text-figs.

Until recently pellagra was practically unknown in Massachusetts. Of ten cases which have now been recognised all occurred since 1910; the only case previously noted was one in 1862. Two typical cases of pellagra are described in full, in both of which poverty and malnutrition seemed to play a part. Maize did not enter much into the diet in either case.

H. M.

GEHRING (Edwin W.). **Pellagra in Maine.**—*New York Med. Jl.* 1913. Dec. 20. Vol. 98. No. 25. pp. 1212-1213.

Three cases of pellagra in Oxford County, Maine, U.S.A., in which marked gastro-intestinal symptoms and typical skin lesions were present. In two, mental symptoms preceded those of the other systems. In the other case mental symptoms were absent. There was nothing special in the food or surroundings which might help to clear up the etiology.

H. M.

BAILEY (R. T.). **Two Cases of Pellagra.**—*British Guiana Medical Annual for* 1912. pp. 115-118.

A description of two fatal cases of pellagra occurring in British Guiana. Typical symmetrical skin lesions, gastro-intestinal mani-

festations and nervous derangements were present in both cases, as well as profuse salivation, stomatis and albuminuria. In both a peculiar odour of " herring or rancid brine " was noticeable about the body.

H. M.

STANNUS (Hugh S.). **Pellagra in Nyasaland.** (Second Communication.) —*Trans. Soc. Trop. Med. & Hyg.* 1913. Nov. Vol. 7. No. 1. pp. 32-56. With 4 maps and 1 diagram.

In Nyasaland, during the 15 months preceding April 1911, 40 cases of pellagra were described among the inmates of the Central Prison, Zomba. From March 1912 to March 1913, 131 cases were recorded in the prison, by far the largest number occurring in the autumn of 1912. A characteristic feature is the sodden and thickened epithelium appearing at the angles of the mouth; the lips or tongue are affected in a large proportion and this symptom may be used for diagnosis at a season of the year (February and March) when no rash has appeared. In addition to the prisoners, several lunatics confined in prison also developed symptoms of pellagra and three cases occurred among inmates of the asylum. In several cases relapses have been noted.

The disease has now been met with outside the prisoners, among the warders and among the native troops, in all of whom lip and tongue symptoms, but no rash, were noted. Other cases have been met with in Zomba and at places within 15 miles of Zomba and also in the Chikala district. In Western Nyasa and in Momberas out of 36,000 natives examined none shewed pellagrous symptoms.

Males were found to be more commonly attacked than females. The gangs of prisoners are employed chiefly in road-making and in clearing the streams in Zomba. The women, all non-pellagrous, are employed close to the prison.

The prisoners' diet consists generally of rice; out of 131 pellagrous prisoners only four ate maize. Maize theories of causation are therefore excluded, but the facts observed are still consistent with an intoxication by damaged rice or grain, or with some deficiency in a grain diet consisting of rice or maize. During January and February simulium larvae and pupae abound in the streams of Zomba, and the prisoners who work at clearing these streams when simulium is breeding in the greatest numbers are liable to be bitten by them; the incidence of pellagra among groups of natives has been found roughly proportional to the liability to attack by Simulium. Possibly the cases described as relapses are due to seasonal reinfection or intoxication. In Zanzibar no case of pellagra has been diagnosed, but cases of beriberi, with soreness of the angles of the mouth, are described.

H. M.

MENSE (C.). **Reisebeobachtungen über Pellagra.** [Itinerant Observations on Pellagra.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Nov. Vol. 17. No. 22. pp. 788-793.

The author, who inclines to the infection theory of pellagra, points out that pellagra seems to be distributed over the whole world and sporadic cases are appearing in every country. Observations by MERK, which shew that the disease is not hereditary, are quoted.

According to MERK certain skin lesions, which were looked upon as those of hereditary pellagra, are quite as common in the children of non-pellagrins as in those of pellagrins.

On the other hand BRESADOLA has shewn that certain nervous manifestations and intestinal troubles appear in the children of pellagrous ancestors. With regard to the effect of alcohol as a predisposing factor in the etiology of pellagra opinions are divided. Notes on the manifestations of the disease in different districts are given. The author finds that the potassium sulphocyanide content of the saliva is decreased and suggests the possible utility of this observation in diagnosis.

H. M.

COMMISSIONE PELLAGROLOGICA PROVINCIALE DI BELLUNO. **Relazione del Presidente Dottor LUIGI ALPAGO-NOVELLO a S.E. il Ministro di Agricoltura Industria e Commercio.** [Report of the President of the Provincial Pellagrological Commission of Belluno.]—*Riv. Pellagrologica Italiana.* 1913. Sept. Vol. 13. No. 5. pp. 67-69, and Nov. No. 6. pp. 86-89.

The diminution of pellagra in Belluno (Venetia) is confirmed on all sides, the chief aim of the Commission is to prevent feeding with spoiled maize, and to diminish the cultivation of maize where this does not ripen well or can usefully be replaced by other crops. It is established that pellagra appears wherever maize is excessively cultivated and follows the introduction of the grain. An account of the measures taken to combat the disease is given ; these include popular instruction in the schools, the inspection of grain, a large quantity of the latter having been confiscated, and the cultivation of other edible crops (beetroot, potatoes, etc.) in place of maize.

H. M.

WEISS (Ettore). **La Pellagra nel Tirolo meridionale e l'Azione del Governo contro la Stessa.** [Pellagra in South Tyrol.]—*Riv. Pellagrologica Italiana.* 1913. Nov. Vol. 13. No. 6. p. 90.

The number of cases in Tyrol is decreasing; this is ascribed to better general conditions and to the limitation of the use of maize (sound as well as spoiled) as the staple article of diet. Pellagra is undoubtedly connected with maize and is probably due either to lack of some necessary substance, as in the case of beriberi, or to some poisonous substance introduced by maize—especially by bad maize. Pellagra is much more prevalent where the flour used is very fine without husk.

H. M.

FERRANNINI (L.). **La Pellagra in Inghilterra.** [Pellagra in England.] —*Riforma Medica.* 1913. Oct. 11. Vol. 29. No. 41. pp. 1135-1136.

A general historical account of the occurrence of pellagra in the different European countries. The first known case of the disease occurred in Spain and was described in 1735.

FRAPOLLI first recognised it in Italy and called it pellagra.

Sambon has shewn that the first definite case in Great Britain occurred in Scotland in 1863, the next in 1906, and a third in 1909. In England in 1912 a patient suffering from pellagra was admitted to St. Thomas's Hospital; in this case two brothers of the patient also contracted pellagra. Other cases have now been diagnosed in England.

Sambon asserts that the occurrence of the British cases lends support to his theory and absolutely eliminates the possibility of maize being the etiological factor.

H. M.

Hogg (C. A.). **Cases of Pellagra-like Skin Lesions in Australia.**—*Australasian Med. Gaz.* 1913. Oct. 18. Vol. 34. No. 16. (No. 457). pp. 357-363. With 3 figs.

Since very few gnats are found in Australia, the presence of cases of pellagra would furnish evidence against the Sambon theory of gnat transmission. Four cases presenting the typical skin lesions and mental symptoms of pellagra occurred in New South Wales. The writer inclines to the view that these were typical cases of pellagra.

H. M.

Aetiology.

Siler (J. F.), Garrison (P. E.) & MacNeal (W. J.). **Pellagra. A Summary of the First Progress Report of the Thompson-McFadden Pellagra Commission.**—*Jl. Amer. Med. Assoc.* 1914. Jan. 3. Vol. 62. No. 1. pp. 8-12.

The Commission report that a study of the prevalence and distribution of the disease and of the dietary of the pellagrins and non-pellagrins in the same district gives no support to the view that the ingestion of maize (good or spoiled) is the essential cause of pellagra. A striking feature is the high incidence of the disease among females of the cotton-mill village population between 19 and 45 years. Poverty of nutrition, child birth, tuberculosis and other weakening causes play important roles as predisposing factors. The higher incidence of pellagra in the more populous districts and the indication of its occurrence in definite foci support the view that pellagra is a specific infection communicated from person to person, transmitted possibly by the blood-sucking insect *Stomoxys calcitrans*, possibly by the contamination of the food or by some other means as yet unknown.

H. M.

Hunter (S. J.). **Pellagra and the Sand-Fly. II.** [With Discussion.]—*Jl. Economic Entomology.* 1913. Feb. Vol. 6. No. 1. pp. 96-101.

The results of an investigation on the relation of pellagra to the presence of sand-flies in Kansas are recorded. The following facts have been ascertained:—(1) The number of sand-flies has been directly proportional to the number of cases of pellagra, while the first appearance of the cases coincides with the principal broods; the flies appear to bite more vigorously immediately after the principal broods. (2) Sand-flies which are fed on human blood live several days longer

than those which have not been so nourished, thus favouring an incubation period of a parasite if such there be. (3) The presence of pellagra in Kansas has been confined almost entirely to one restricted locality. Of nine cases recorded last year, five were traced back to one town in which flies are usually abundant.

These observations support the SAMBON theory, but against this theory is the fact that pellagra has never been produced in any other animal experimentally, either through inoculation or through transference by means of sand-flies.

Since nearly all the cases of pellagra were in natives who had never been out of the State, the cause of pellagra exists in Kansas.

H. M.

WOOD (Edward J.). **Some Problems in the Etiology of Pellagra.**—*Interstate Med. Jl.* 1913. May. Vol. 20. No. 5. pp. 437-442. With a map.

A discussion of certain difficulties in the etiology of pellagra. It is pointed out that the corn theory is untenable and that well-nourished men are sometimes attacked, so that inanition is not the cause. As a result of his experience the author favours SAMBON'S theory.

H. M.

HARRIS (William H.). **The Transmission of Pellagra from Man to Monkey.**—*New Orleans Med. & Surg. Jl.* 1913. Nov. Vol. 66. No. 5. pp. 385-386.

The author claims to have transmitted pellagra from man to monkey in two cases (see this *Bulletin*, Vol 2, p. 494.) In the first case portions of the brain and cord, skin, and part of the intestinal tract shewing marked lesions were removed from the body of a patient who had died from pellagra. An emulsion of these materials was made and Berkefeld filtrates obtained from them. These were inoculated in large quantities subcutaneously, intravenously, and intracranially. After an unexpectedly long period of incubation this animal developed clinical signs and symptoms similar to those of pellagra and finally died. An examination post mortem revealed only the lesions found in fatal pellagra. The skin especially presented the hyperkeratosis and pigmentation identical with that found in the skin in human beings. In the second case emulsions were prepared as before from a typical fatal case of pellagra. In this instance the ileum, which shewed very marked lesions, was especially selected. Injections of a filtrate of the emulsion were given to a monkey exactly as in the first case. Two months later this monkey was re-inoculated. After two months diarrhoea set in accompanied by inflammation of the tongue, loss of appetite and erythematous skin lesions over the bridge of the nose which spread over the cheeks and under the eyes. Lesions characterised by their symmetry of location and shape developed upon the conchae of both ears, the shoulders, arms, and dorsal surface of the hands. Pigmentation was in evidence and scales and plaques finally occurred. Assuming that the induced disease is true pellagra, these results suggest that the etiological factor of pellagra may be a member of the group of filter-passers. [In this connection a control from a non-pellagrin would be interesting.] H. M.

MEREDITH (Duane). **A Report of Research Work on Pellagra, with Isolation of Possible Causative Factor.**—*Texas State Jl. of Med.* 1913. Oct. Vol. 9. No. 6. pp. 191-192.

The author claims to have isolated from two cases of pellagra a micro-organism which when injected intraperitoneally into a chicken induced suspicious lesions of the legs and marked atrophy of the comb and gills. [Technique observed is open to criticism.]

H. M.

DRISCOLL (T. Latane). **A Theory of the Etiology of Pellagra.**—*Southern Med. Jl.* 1913. Vol. 6. No. 6. pp. 400-401.

The theory is put forward that pellagra is due to a deficiency of some essential chemical substance in the diet. This substance is present in the outer layer of the corn grain and is removed to a large extent in the processes of milling and sifting. In Italy, so marked is the distaste for bran that the natives sift their meal several times and so get rid of the essential substance. In the case of spoiled maize the outer layer is certainly injured. Some results obtained in experiments on chickens are advanced in support of these claims. Chickens fed on corn with the outer covering removed develop manifestations on the legs similar to those of pellagra in man. Chickens fed on bran only develop the same condition. The symptoms disappear in about three weeks when the chickens are fed on whole corn. In four cases of pellagra in man good results were obtained by feeding on corn meal to which bran had been added.

H. M.

NIGHTINGALE (P. A.). **Zeism or Pellagra?**—*Brit. Med. Jl.* 1914. Feb. 7. pp. 300-302.

In 1912 the author described cases of a disease with certain pellagra-like symptoms which occurred in Rhodesia. He stated that this disease, though in some respects resembling pellagra, was certainly not pellagra, and on account of its connexion with maize called it "Zeism." SAMBON however affirms (*Brit. Med. Jl.*, July 5, 1913) that these cases of so-called zeism were really pellagra and the present article is an attempt to prove "either that Zeism is not the same as Pellagra, or if it is, that Pellagra at least in this part of the country (Rhodesia) is directly due to the loss of some essential nutritive constituent during the process of grinding maize into meal." Cases of zeism occurred when meal from which the husk was removed formed the staple article of diet. When this was replaced by meal containing the husk, improvement immediately set in and no fresh cases of the disease arose.

H. M.

LOFTEN (Lucien). **The Cause of Pellagra. (Preliminary Report).**—*International Jl. of Surgery.* 1913. Aug. Vol. 26. No. 8. pp. 289-290.

The author has met with nine cases of pellagra recently in which careful examination of the faeces was carried out, with the result that hookworm or hookworm eggs were found in every case. A history

of hookworm infection was secured in every instance and it is pointed out that pellagra is always present where there is hookworm! The suggestion advanced is that pellagra and hookworm infection may be the same condition with different names, pellagra being regarded as the result of a "latent hookworm poison." No typical skin lesions were present in these cases. [The great prevalence of hookworm infection in some localities, e.g. 90 per cent. infected, makes it necessary to examine a large number of controls before assuming that pellagra or any similar condition can be attributed to hookworm infection.]

H. M.

Clinical.

Reid (Robert), & Calwell (William). **Notes of a Supposed Case of Pellagra.**—*Brit. Med. Jl.* 1913. Sept. 27. pp. 784-785.

A supposed case of pellagra occurring in Belfast, the patient being a farmer aged 66. Dermatitis of the back of the hands was very pronounced and was present to a certain extent on the chin and parts about the mouth. There was also desquamation, at intervals, of the skin of the neck and chest. The mental condition of the patient appeared to be fairly normal though a few nervous manifestations such as irregularity of the pupils and stiff gait were present. The knee jerk was absent in the left leg and feebly marked in the right. The patient complained of occasional diplopia, soreness at the angles of the mouth, tingling in the feet and slight staggering.

H. M.

Lempriere (L. R.). **Pellagra.** (Memoranda.)—*Brit. Med. Jl.* 1913. Sept. 27. p. 810.

The case of a woman aged 32 living at Llanidloes, Glamorgan, who suffered periodically from symmetrical rashes on the forehead, under the eyes, over the nose and cheeks, slightly below and behind the ears, on the upper part of the neck and on the back of the hands and wrists. The first attack took place in the summer of 1909. The rash was at first red and itchy, followed by blebs and finally desquamation. Gastric and intestinal disturbances were present, together with mental symptoms which necessitated her removal to an asylum for six months.

Occurrence of the rash took place each summer but no mental symptoms followed. When she was seen in August 1913, skin symptoms were very marked and the patient suffered from diarrhoea and retching. Knee jerks were negative, ankle clonus was present and there was some irregularity of the pupils. No mental symptoms were noted. The patient was in a very weak condition. Gradual recovery took place.

H. M.

Johnstone (Emma M.). **A Note on a Case of Pellagra.**—*Lancet.* 1913. Oct. 18. pp. 1114-1115. With 2 figs.

A full description of a case of pellagra in an Englishwoman, with a record of two other cases in insane female patients; in no case was there evidence that any maize had been eaten.

H. M.

SPURGIN (W. H.). **Acute Pellagra or Dermatitis exfoliativa?**—*New York Med. Jl.* 1913. Nov. 29. Vol. 98. No. 22. pp. 1070-1071.

An account of a case from the North of England in which symptoms strongly resembling those of pellagra are described—dermatitis, profuse desquamation, erythema, suppuration, pyaemia and emaciation. It is stated that no Simulidae or Culicidae were found by the bacteriologist " although urine, pus and stools were examined."

H. M.

RAINSFORD (F. E.). **On a Fatal Case of Pellagra in an Insane Patient.** —*Lancet.* 1913. Dec. 20. pp. 1759-1760.

This is interesting as the first case of pellagra recorded in Ireland. The patient was a woman, 70 years old, whose dietary had not included maize.

H. M.

PEARSON (R.W. J.). **Report of Egyptian Case [of Pellagra].**—*Trans. Soc. Trop. Med. & Hyg.* 1913. Apr. Vol. 6. No. 5. pp. 161-163.

Report of a typical fatal case of pellagra in an Egyptian woman aged 30. In this case the diet was largely made up of dhurra. Post mortem, adhesions and thickening of the cerebral membranes were found. The spinal cord membranes shewed much granular, blackish brown pigment and cerebro-spinal fluid was present in excess. The stomach and intestines were thinned and transparent, the heart flabby and atrophied and the kidneys somewhat fibrous.

H. M.

DRUMMOND (J.). **Pellagra in Durban.** [With Discussion.]—*S. African Med. Rec.* 1913. Oct. 11. Vol. 11. No 19. pp. 416-419.

A very complete description of a fatal case of pellagra in a native in Durban. The only characteristic lesion found post mortem was a thinned bowel, but without ulceration.

H. M.

TUCKER (Beverly R.). **Early and Undeveloped Cases of Pellagra.**— *Southern Med. Jl.* 1913. April. Vol. 6. No. 4. pp. 232-234.

By careful investigation of the history of the patient and attention to apparently slight symptoms, much can be done in diagnosing early cases of pellagra. In doubtful cases attention should be paid to the part of the country in which the disease occurs, the diet, habits, and previous health of the patient, the season of the appearance of symptoms and the history of disturbances of a similar nature. Such symptoms as stomatitis, salivation, diarrhoea, vomiting, proctitis, and all cutaneous and nervous manifestations should be noted. In the treatment of pellagra urotropin has proved of most value in the author's hands.

H. M.

TREATMENT.

SOZZI (Luigi). **La Cura della Pellagra col Siero Nicolaidi.** [The Treatment of Pellagra with Nicolaidi's Serum.]—*Riv. Pellagrologica Italiana.* 1913. Sept. Vol. 13. No. 5. pp. 72-74.

The serious disturbance of metabolism in pellagra especially affects the inorganic constituents. The pellagrin is demineralised. In Nicolaidi's treatment, which has been successfully used in Roumania and Italy, a serum rich in mineral constituents is injected. The present paper is an account of the treatment of four certain and one suspected case of pellagra, with injections of 50 cc. of Nicolaidi's serum in the gluteal and lumbar dorsal regions. The injections were made on alternate days and were followed by ten minutes' massage. During the treatment the patients drank water containing excess of siliceous constituents.

The author finds that after 18 injections the gastro-intestinal functions were restored to normal, the cutaneous symptoms improved and the nervous tone of the patient raised. The condition of the reflexes was not affected by the treatment.

H. M.

NILES (George M.). **The Treatment of Pellagra. An Optimistic Survey of its Present Status.**—*Jl. Amer. Med. Assoc.* 1914. Jan. 24. Vol. 62. No. 4. pp. 285-287.

A review of general treatment used successfully by the author involving attention to hygiene, diet, drugs and psychotherapy. Alternate injections of iron arsenite (16 minims) and sodium cacodylate ($\frac{3}{4}$ grain) were used and internally a saturated solution of potassium iodide and Fowler's solution.

H. M.

PATHOLOGY.

SINGER (H. Douglas) & POLLOCK (Lewis J.). **The Histopathology of the Nervous System in Pellagra.**—*Arch. Internal Med.* 1913. June 15. Vol. 11. No. 6. pp. 565-589. With 34 coloured figs.

In the acute attack of pellagra and in the interval the nervous changes present a picture compounded of acute and chronic types of reaction. The acute changes include direct and indirect chromatolysis of nerve cells, satellitosis, astrocytosis, and the presence of amoeboid glia cells. There is also a very moderate amount of perivascular infiltration indicating general intoxication.

The fact that the perivascular infiltration of the acute attack is not more marked than that found in the interval, furnishes an additional argument against an acute local infection of the nervous system during the acute outbreak of the disease.

The chronic changes include fatty and fibroid degeneration, chronic Nissl changes of the nerve cell, increase of glia fibres, regressive changes of the glia cells, permanent destruction of nerve fibres and a marked increase of amyloid bodies. Chronic vascular changes were limited to cases of chronic alcoholism and senility.

The reaction known as "central neuritis" was constantly present in all cases examined where death had ensued soon after an attack

of pellagra. In two patients dying 18 months after an attack this type of change had entirely disappeared, while in a third case in which death took place three and a-half months after such an attack the change was present only to a slight degree.

There was no evidence of a local bacterial infection of the nervous system.

H.M.

Wilson (S. A. Kinnier). **The Pathology of Pellagra.**—*Proc. Roy. Soc. Med.* 1914. Feb. Vol. 7. No. 4. Neurological Section. pp. 32-41.

A preliminary account of the pathological changes found in the organs of 13 cases of pellagra. In nine cases the material was obtained from Nyasaland while the four other cases were English. In all there was abundant evidence of a widespread generalised toxaemia of the peripheral and central nervous system. Peripheral nerves stained by the Weigert-Pal method or by Marchi's method shewed more or less irregular areas of degeneration of the myelin sheaths. Involvement of the axons has been noted only in advanced cases. Several of the sciatic nerves exhibited definite oedema of the nerve fibres and the "Mastzellen" of Ehrlich were found in abundance. By staining with thionin blue or toluidin blue a marked increase of certain minute granules or flakes—the π granules of Reich—was found. These granules, which are present to some extent in normal peripheral nerves, occur chiefly in the sheath of Schwann.

Various degenerative changes were also found in the spinal cord, mainly in the posterior and lateral columns, but there was no well defined limitation to particular tracts. These changes were accompanied by alterations in the nerve cells of the medulla, pons, cerebellum and cerebrum.

In the abdominal and thoracic viscera the usual conditions of atrophy, fatty degeneration, ulceration, pigmentation, etc. were in evidence, while the skin presented changes in the Malphigian bodies, hyperaemia and other lesions.

The conclusion arrived at, in view of these results, is that in pellagra the morbific agent is probably not a virus but a toxin.

H. M.

Macneal (W. J.). **Observations on the Intestinal Bacteria in Pellagra.**—*Amer. Jl. of the Med. Sciences.* 1913. June. Vol. 145. No. 6. (No. 495). pp. 801-806.

A survey of the faecal bacteria in pellagra by the Illinois State Pellagra Commission shewed that their quantitative relationships differ from the normal and that unusual kinds of bacteria are present. The abnormal types were various in nature and in no case dominant in numbers. One hundred bacterial strains were subjected to agglutination tests, using blood serum from pellagrins and from normal individuals. One of these strains, "No. 67," had the following characteristic—rods 4 by 1·4μ (variable), does not liquefy gelatin, slightly clots milk, produces no gas with glucose, fructose, lactose, saccharose, or mannose, and produces pigmentation on agar. This was agglutinated by the sera of pellagrins but also by the sera of some normal persons. The same culture was now tested with sera from pellagrin

cases of South Carolina, sent by the THOMPSON-MCFADDEN Pellagra Commission. Of 109 pellagrous sera, 74·3 per cent. gave complete agglutination, 10·1 per cent. almost complete, 2·7 per cent. marked, 2.8 per cent slight, and only 10·1 per cent. gave negative reactions. Of 49 controls, 22·5 per cent. gave complete agglutination, 8·2 per cent. almost complete, 26·5 marked, 14·3 per cent. slight and 28·5 per cent. were negative. The results are suggestive, although they do not warrant the assumption of a specific agglutination reaction. From the intestinal contents 693 new bacterial strains have been isolated and tested. No strain similar to "No. 67" has been isolated from the faeces; a few strains from the duodenal fluid, which give the agglutination reaction with pellagrous sera, seem to resemble "No. 67."

H. M.

HILLMAN (O. S.). **Some Hematological Findings in Pellagra.**—*Amer. Jl. of the Med. Sciences.* 1913. Apr. Vol. 145. No. 4. (No. 493). pp. 507-513.

This investigation deals with material sent by the THOMPSON-MCFADDEN Pellagra Commission at Spartanburg, South Carolina, to the New York Post-Graduate School during the summer of 1912. The hemoglobin content, the number of red and white cells per cmm., the differential leucocyte count and general morphologic characteristics of the blood in stained preparations were examined, and in some cases the coagulation time was investigated. The technique is described and tables of the results are given. The authors conclude that a variable degree of anaemia exists in many cases, but that the disease may be present for some time without leading to any anaemic changes. The presence of a leucocytosis is not infrequent and may suggest the possibility of an infectious etiology of obscure origin or be due to complicating disturbances. Twenty-four out of thirty-two differential counts gave an absolute lymphocytosis. No characteristic variations in the large mononuclear leucocytes and eosinophiles were observed.

H. M.

MYERS (Victor C.) & FINE (Morris S.). **Metabolism in Pellagra.**—*Amer. Jl. of the Med. Sciences.* 1913. May. Vol. 145. No. 5. (No. 494). pp. 705-720.

A description of work carried out on patients sent to the Post-Graduate Hospital by the THOMPSON-MCFADDEN Pellagra Commission. The gastric contents were examined and the patients placed upon a weighed diet (lacto-vegetarian and practically purin-free) and the urine and faeces were examined daily for a period of from 7–10 days. The ability to utilise the food taken appeared to be practically normal, and the elimination of mineral and nitrogenous constituents in the urine such as might be anticipated from the dietary and physical conditions of the individuals. The low creatinin coefficients and the elimination of small amounts of creatin in the urine pointed to a lowered physiological efficiency. In six out of 14 cases hyalin casts were found. In eight cases, free hydrochloric acid was not present in the stomach contents, while the total acidities were low and pepsin was absent or present only in small amount. Considerable quantities

of indican were found in the urine and excessive amounts in those cases shewing total anacidity. Some cases with low indicanuria and with free HCl in the gastric juice had a fairly high elimination of ethereal sulphates, but the total ethereal sulphates as well as the indoxyl potassium sulphate were increased in anacidity. The faeces contained abnormal amounts of indol and skatol. Unusual bacterial putrefaction high up in the intestines was indicated.

H. M.

LABORATORY.

OBREGIA (A.) & PITULESCO. **La Séro-Réaction d'Abderhalden dans la Pellagra.**—*Compt. Rend. Soc. Biol.* 1913. Dec. 19. Vol. 75. No. 36. pp. 587-588.

Abderhalden's serum reaction was applied by the authors to seven cases of pellagra, two incipient shewing only cutaneous and gastro-intestinal symptoms, the remaining five being advanced cases with mental disturbances.

The method of dialysis was employed, the technique of ABDERHALDEN and FAUSER being followed. The organs were obtained from an old pellagrin. Of the two incipient cases one was cured and awaiting discharge, and with this case only negative results were obtained; with the other the sympathetic gave positive results, the thyroid feebly positive, the cerebral cortex and the genital glands negative.

Of the five advanced cases all reacted strongly with the cerebral cortex, four feebly with the sympathetic, three feebly with the thyroid and two with the liver and heart. In all cases, negative results were given by the genital glands. The authors conclude that in both early and late stages there is a disturbance of function of the sympathetic, which also explains the results obtained with the thyroid. The reaction with the cortex in all the advanced cases shews an intense disturbance of function of the cerebral cortex.

H. M.

FUNK (Casimir). **Studies on Pellagra. I. The Influence of the Milling of Maize on the Chemical Composition and the Nutritive Value of Maize Meal.**—*Jl. of Physiology.* 1913. Dec. 19. Vol. 47. No. 4-5. pp. 389-392.

Analyses of the milled maize grain and of the millings are given. The second millings from a highly milled grain are shewn to be considerably richer in phosphorus, amino-nitrogen and fats than any other portion of the grain. The suggestion is advanced that the manifestations of pellagra in different countries may be correlated with the extent of milling of the grain.

H. M.

ADLER (Herman M.). **The Experimental Production of Lesions resembling Pellagra.**—*Boston Med. & Surgical Jl.* 1913. Mar. 27. Vol. 168. No. 13. pp. 454-456.

Ten rabbits fed daily with 5 cc. per kilo weight of olive oil developed the blood picture of secondary anaemia within a few days; in four rabbits the blood picture of pernicious anaemia developed in from

two to three months. In six out of ten, severe skin eruptions appeared on the inner surface of the ears and acute enteric symptoms; three of the four rabbits that escaped had been daily dosed with ·3 gr. of quinine for a year previously. The author ascribes the symptoms chiefly to the haemolytic action of the oleic acid, and concludes that a condition characterised by dermatitis and acute enteritis need not be a specific reaction to a specific causative agent, but may be a general reaction common to a large number of pathological conditions.

H. M.

VOLPINO (G.), & BORDONI (E. F.). **E Possibile un'Immunizzazione attiva dei Pellagrosi?** [Immunity of Pellagrins.]—*Riv. Pellagrologica Italiana.* 1913. Nov. Vol. 13. No. 6. pp. 81-84.

In experiments carried out on 20 guinea-pigs, ten were injected with extract of maize periodically at intervals of two or three days. After 15 days of the treatment they were fed exclusively on maize, the injections being continued for 20 days more. The other ten were fed on maize, no injections being given.

After 30 days seven of the injected guinea-pigs were still alive while of the ten untreated ones, only three survived. Both treated and untreated ones died after 55 days. Somewhat similar results were obtained in other experiments and the conclusion is arrived at that the injection of maize extract confers a certain resistance during the early stages on a guinea-pig fed on maize. Later on, death ensues in all cases owing to the unsuitability of the maize as food. Attempts to increase the resistance of human beings suffering from pellagra by the injection of maize extract are mentioned. These experiments are based on the hypothesis that pellagra is due to some toxic substance obtained from maize.

H. M.

VOLPINO. **Ricerche sulla Pellagra.** [Researches on Pellagra.]—*Giorn. R. Accad. Med. di Torino.* 1913. Jan.-Feb. Vol. 76. No. 1-2. p. 42.

A short note of some results obtained in certain experiments in which 100 pellagrins and 78 non-pellagrins were injected with extract of maize. Of the pellagrins injected 90 per cent. gave a positive reaction indicated by nervous and cutaneous manifestations, while only 20 per cent. of the non-pellagrins gave any response.

Guinea-pigs fed on rice and injected after some time with ½–1 cc. of pellagrous blood became ill and soon died. Others fed in the same way but treated with injections of maize extract were somewhat more resistant.

H. M.

RONDONI (Pietro). **Sulla Ipersensibilità delle Cavie Maidizzate di fronte al Siero di Sangue dei Pellagrosi, con Considerazioni sulla Genesi della Pellagra.** [On the Hypersensibility of Guinea-pigs fed with Maize to Pellagrous Blood Serum.]—*Riv. Pellagrologica Italiana.* 1913. Nov. Vol. 13. No. 6. pp. 84-86; and 1914. Jan. Vol. 14. No. 1. pp. 6-8.

The author agrees with VOLPINO that guinea-pigs fed on maize shew a marked hypersensibility to pellagrous serum and that pellagrous patients shew a certain hypersensibility to extracts of maize, but

considers that the changes observed are perhaps not quite so marked as those described by VOLPINO. He notes that the researches of CESA BIANCHI, FINATO and NOVELLO confirm VOLPINO'S results, while the experiments of VOLPI-GHIRARDINI and LUCCARI fail to do so or at least are inconclusive.

SZUMOWSKI showed that injection of an alkaline solution of zein reduces the coagulability of the blood and the author has noted a similar phenomenon in the case of guinea-pigs fed on maize.

H. M.

VOLPI-GHIRARDINI (Gino) & ZUCCARI (Giuseppe). **Sulla Ipersensibilità delle Cavie ad Alimentazione Maidica per il Siero di Sangue di Pellagroso.** [On the Hypersensibility of the Maize-fed Guinea-pig to Pellagrous Blood Serum.]—*Riv. Pellagrologica Italiana.* 1913. Sept. Vol. 13. No. 5. pp. 69-71; and 1914. Jan. Vol. 14. No. 1. pp. 9-11.

A description of experiments carried out by the authors to ascertain the effect of maize diet on the hypersensibility of guinea-pigs to pellagrous serum and to aqueous extract of spoiled maize, prepared according to CESA-BIANCHI and PELLARDI'S method. The guinea-pigs were divided into three groups—(1) fed with spoiled maize; (2) fed with sound maize; (3) kept on a diet of bread and greens. The serum from the same patient was injected at the same time into one or more guinea-pigs from each group; and the experiments were carried out under conditions as comparable as possible. The total number of animals used was small (22), but the authors claim that this was partly compensated for by the care taken with the experiments. The guinea-pigs were first kept on their diet for from 16–36 days before the injection, a period comparable with that used in the experiments of CESA-BIANCHI and VALLARDI and of VOLPINO. Contrary to the results of these latter observers, no animal died in the 24 hours following the injection nor within the following weeks. Pronounced symptoms appeared within half an hour, but after some hours the animals appeared to be quite well. The chief phenomena following the injection (intra-peritoneally) were increased temperature and convulsions accompanied and followed by disturbances of respiration, paresis, retraction of the flanks, erection of the hair, etc. Lowering of the rectal temperature followed injections both of maize extract and of pellagrous serum, and was indistinguishable in guinea-pigs fed on maize and on other food. The convulsive phenomena were more pronounced, after injections of 2–3 cc. pellagrous serum, in guinea-pigs fed with spoiled maize, less pronounced and less constant in animals fed with sound maize, and still less constant in those fed on ordinary diet. In one experiment in which non-pellagrous serum was injected into a guinea-pig fed on spoiled maize they were absent, and they are inconstant after the injection of maize extracts. It is not possible to draw definite conclusions, but there seems to be evidence of a hypersensibility in maize-fed guinea pigs (especially with those fed with spoiled maize) towards pellagrous serum. It is not sufficiently definite to regard it as a specific anaphylactic reaction.

H. M.

FINATO (D. ri L.) & NOVELLO (F.). **Ricerche sulla Ipersensibilità dei Pellagrosi.** [Hypersensibility in Pellagrins.]—*Gaz. Internaz. Med. Chirurg. Igiene.* 1913. Nov. 1. No. 44. pp. 1038-1044.

Experiments prove that there exists in pellagrous patients a hypersensibility to extracts of maize. After the injection of maize extract a more or less powerful reaction is obtained in which the chief symptoms are vomiting, increased respiration, rise of temperature, intense local pain at the seat of injection and shivering, followed sometimes by delirium and coma. The reaction gradually disappears with disappearing symptoms, and is generally lacking or very slight in non-pellagrins. If these observations are confirmed, this hypersensibility of the pellagrin to maize extract might serve as a means of diagnosis in doubtful cases.

H. M.

PREVENTION.

RIVISTA PELLAGROLOGICA ITALIANA. 1913. Sept, Vol. 13. No. 5. pp. 74-79.—**Per l'Applicazione della Legge 21 Luglio 1902 contro la Pellagra.** [On the Administration of the Law of July 21st 1902 for the Prevention of Pellagra.]

This communication deals with the measures taken for the prevention and cure of pellagra in the Provinces of Bergamo, Brescia, Ferrara, Mantora, Treviso and Udine. The Pellagrological Commission of Bergamo recommends the compulsory feeding of the pellagrous poor with a prescribed diet, as well as other curative and prophylactic measures.

H. M.

CANTARUTTI (G. B.) & Others. **La Vigilanza sul Mais.** [Supervision of Maize.]—*Riv. Pellagrologica Italiana.* 1913. Sept. Vol. 13. No. 5. pp. 65-66.

A report of the Commission appointed by the Chamber of Commerce of Udine to consider whether the existing regulations for the supervision of foreign and indigenous maize were sufficient. The Commissioners express their belief in the maize theory of pellagra and recommend that the powers already existing under the present laws for the examination of maize should be more adequately enforced. They recommend the institution of a Provincial Pellagrological Inspectorate.

H. M.

FILARIASIS.

RODENWALDT (Ernst). **Eine neue Mikrofilarie im Blut des Menschen.** [New Microfilaria in the Blood of Man.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Vol. 18. No. 1. pp. 1-12. With 1 plate & 3 text-figs.

The author amplifies his preliminary note on a new micro-filaria found in the blood of man [see this *Bulletin* Vol. 3, p. 102]. The finer anatomy is described and compared with that of the embryos of *Filaria loa* and *F. bancrofti*. The absence of a sheath in well stained haematoxylin specimens at once differentiates it from those two forms. No periodicity is present, embryos occurring in the blood by day as well as by night. Unfortunately no definite measurements are given, the author at the moment not possessing the necessary apparatus. The question of the embryo being that of the *Onchocerca volvulus* is next discussed. The patient suffered from volvulus tumours over the ribs and under a local anaesthetic these were excised. From the tumour all stages of the *Onchocerca* embryos, from the youngest egg to the fully developed micro-filaria, could be studied. This showed that the younger examples were larger than the older ones and that they possessed a much more limited movement. Finally the author concludes that there is no clear proof that the young of the *Onchocerca* are the same as the embryos seen in the blood and lymph, because in the tumour and in its immediate neighbourhood no identical examples were to be found. He therefore proposes to name this large sheathless filaria of the blood of man "*Microfilaria nuda*."

[It is quite evident that Rodenwaldt has found the same embryos described by OUZILLEAU (see this *Bulletin* Vol. 1, p. 419) and by FÜLLEBORN and SIMON (*loc. cit.* Vol. 3, p. 100). The paper by the latter authors certainly tends to show that these filariae are the same as the young of *Onchocerca volvulus*. Careful measurements were made by them whereas, as already stated in the text, Rodenwaldt had not the opportunity. It is premature therefore to give this embryo a specific name. It is evident that the embryos of the *Onchocerca volvulus* must escape somehow and the observations made by the authors mentioned above seem clearly to prove how this is accomplished.]

G. C. Low.

LEGER (M.), & LE GALLEN (R.). **Fréquence de *Filaria bancrofti* chez des Sujets de la Guadeloupe ne présentant ni Eléphantiasis ni Accidents Lymphangitiques.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 125-129.

To establish the percentage of individuals from Guadeloupe harbouring the embryos of *Filaria bancrofti* in their blood, the authors examined 150 newly arrived recruits from that island at Marseilles. Of these 23, or 15·33 per cent., were infected, the embryos found giving the characteristics of those of *Filaria bancrofti*. These recruits showed no signs of filariasis, no lymphangitis, no chyluria, nor were any of the lesions of elephantiasis present. Eosinophilia occurred in the blood of several. A table showing the locality from which each of the infected persons came is given and this is compared with one by Low for the British West Indian Islands. A comparison of these

indicates that Guadeloupe is heavily infested with filariasis, its percentage being lower than St. Kitts, but, on the other hand, higher than Barbados and Trinidad. *Filaria demarquayi* was not found in the 150 Guadeloupe examinations.

G. C. L.

Noc (F.), & Stévenel (L.). **Filariose, Lymphangite et Eléphantiasis à la Martinique.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 663-667.

Among 4,000 people twelve cases of definite filariasis were seen. These cases included those where the presence of the microfilaria in the organs could be demonstrated. Out of the same number 88 cases of endemic lymphangitis were noted. These are classified as follows :—

(1) Cases of acute recurring lymphangitis with a tendency more or less marked to the development of elephantiasis, 73.

(2) Cases of elephantiasis complicated with frequent attacks of acute lymphangitis, 5.

(3) Cases of elephantiasis without return of further attacks of lymphangitis, 10.

Out of these 88 cases the blood was examined in 24 persons by night alone, and in 14 day and night without any microfilariae being found.

Of 73 persons examined at night, without apparent filarial lesions and with no signs of lymphangitis, four were found to be harbouring the embryos of *Filaria bancrofti* in their blood. Reference is made to the so-called Dermococcus described and cultivated by Le Dantec and Dufougéré. The authors state that this organism can be easily isolated from the regions affected with lymphangitis. Haemocultures taken aseptically from veins and from the lymph of the enlarged glands give the same results. In a section of a lymphatic gland removed from a case of adeno-lymphocele a great number of similar organisms were seen in the lymph.

G. C. L.

Des Barres (Le Roy). **Filariose – Variocèle lymphatique – Présence d'un Ganglion dans le Canal Inguinal simulant une Epiplocèle (Observation résumée).**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1913. Dec. Vol. 4. No. 10. pp. 448-450.

A young man was seen by the author a year ago suffering from lymphatic varicocele on the left side with the presence of filariae in the blood. Twelve months later another swelling appeared which resembled very closely an epiplocele. As the diagnosis, however, was doubtful an incision was made over it. The swelling was found to be due to an enlarged lymphatic gland of the size and form of a haricot bean lying in the middle of the cord. It presented a kind of pedicle which penetrated into the abdomen. No hernial sac was present, but the lymphatics were dilated. These together with the gland were removed. An examination of the latter by Degorce left no doubt about the mass being a lymphatic gland. The author reports the case as being one of great interest.

G. C. L.

KÜLZ (L.). **Bemerkungen zu Ziemann "Tropische Gewebsentzündungen infolge von Filariainfektion" in Heft 14, 1913 des Archivs.** [Remarks on Ziemann's paper, "Tropical Tissue-Inflammations caused by Filarial Infection."]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Mar. Vol. 18. No. 5. pp. 164-166.

The following remarks are made in the paper. The author does not consider that *Filaria loa* is the sole cause of tropical muscle abscesses. He believes that similar lesions may, in some instances, be caused by other filariae but, as he points out, these abscesses are generally deep in the muscles and not in the connective tissues where the filariae chiefly lie. *Onchocerca volvulus* occurs in Kamerun and has to be considered as an etiological factor, but Külz like ZIEMANN has never seen this infection in Europeans. The author proposes to publish further information upon the subject in the *Centralblatt für Bakteriologie* at an early date.

G. C. L.

RAUENBUSCH. **Beitrag zur Filariosis des Auges.** [Contribution to Filariasis of the Eye.]—*München. Med. Wochenschr.* 1913. Dec. Vol. 60. No. 52. p. 2910. With 1 text-fig.

A case of *Filaria loa* seen in Buenos Ayres is described. The patient had acquired the infection in Kamerun where he had suffered from a Calabar swelling of the left arm. Some years afterwards whilst residing in Buenos Ayres an adult male *Filaria loa* appeared in the eye, and was extracted by the author under cocaine. An illustration of the parasite lying in the conjunctiva is given.

G. C. L.

SULDEY (E. W.). **Existence d'une Filaire et d'une Microfilaire chez le Caméléon de Madagascar.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 70-71.

The examination of the blood of a chameleon revealed the presence of microfilariae with characteristics as follows:—non-striated, easily stainable, well-developed sheath, extremely rapid undulatory movements in the fresh state, with measurements in dried preparations of 120–150μ by 8–10μ. In the subcutaneous cellular tissue of the neck adult filariae, apparently the parent forms of the microfilariae of the blood, were found. These measured 3–12 cm. in length by 2 mm. in breadth. Of thirty chameleons examined twenty-five were found to be infected.

G. C. L.

TURKHUD (D. A.). **Dracontiasis.**—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3. pp. 118-120. 1913. Simla: Govt. Central Branch Press.

The author describes observations carried out by him at the Parel Laboratory, Bombay, showing that the larvae of the guinea worm are actually swallowed by the cyclops, the intermediate host. [See this *Bulletin*, Vol. 2, p. 636.] A number of monkeys were fed by the

mouth on cyclops infected for periods varying from 6 to 53 days. Differential leucocyte counts were conducted at subsequent dates. The first monkey fed on cyclops, infected only six days previously to the date of feeding, showed no changes in its leucocytes three months afterwards. The second monkey, fed on cyclops infected for ten days, showed a marked eosinophilia after three months. A careful post mortem examination of this monkey was made later, but no guinea worms were detected either in the internal organs or in the cellular tissue around the viscera. In another experiment guineaworm larvae were found inside a Stegomyia larva, but whether they undergo any further development in this situation was not ascertained.

G. C. L.

BERIBERI.

i. Malay States. **Twelfth Annual Report of the Institute for Medical Research, Kuala Lumpur, Federated Malay States, 1912.** [Fraser (Henry), Director.]— 71 pp. 8vo. 1913. Kuala Lumpur: F.M.S. Goverment Printing Office. [Beriberi, pp. 5-16.]

ii. **Report from the Institute for Medical Research [Kuala Lumpur] for the Period 1st April to 30th September, 1913.** [Fraser (H.), Director.]—Received in Colonial Office, Jan. 24, 1914.

i. A short review is given of recent research relating to oriental beriberi, and the various resolutions that have been passed condemning the use of polished rice as a staple diet for men are mentioned. The author emphasizes the importance of using the ·4 per cent. P_2O_5 as a standard, but draws attention to the fact that even this safe rice may be rendered unsafe by cooking at a high pressure in steam. He describes some experiments which he carried out in reference to Breaudat's theory that storage may convert a harmless into a harmful rice. "These experiments do not demonstrate the necessity for rice being consumed as soon as possible after milling, but they do emphasize the importance of care in the storage of rice." In 1911 no less than 5,340 cases of beriberi were admitted into the government hospitals of the Federated Malay States, and the incidence of this preventable disease was not less than 12·3 per thousand. He calculates that 15,830 cases must have occurred in the Straits Settlements in that year. Preventive and curative methods are therefore urgently required. He describes the various methods of preparing the remedial agent from the rice polishings, so as to supply it in as palatable a form as possible, and he gives details of some experiments on fowls treated with the various preparations. The final extracts contained less of the non-essential materials, yet retained their active properties. Further experiments are in progress to prepare the remedy by less expensive methods. The author states that an effective liquid extract can be prepared, of which a dessert spoonful represents the material obtained from two ounces of fat-free polishings, the daily dose of an adult suffering from beriberi; but rapid recovery in chronic cases cannot be expected.

ii. In this report an account is given of the Wollaston-Kloss expedition into New Guinea, the absence of beriberi among the natives employed being specially referred to. Unpolished rice formed a staple diet, whereas other expeditions, both before and after, which were supplied with polished rice, suffered severely. The author does not accept Funk's formula for the curative substance (vitamine) and again points out that the essential preventive and curative properties are contained in the sub-pericarpal layers and not in the pericarp itself.

P. W. Bassett-Smith.

Fraser (H.) & Stanton (A.T.). **Unpolished Rice and the Prevention of Beriberi**—*Lancet.* 1914. Jan. 10. pp. 96-98. With 1 text fig.

This paper sets out very concisely the views held by the authors of the causation and prevention of beriberi, but contains no new information.

P. W. B.-S.

VEDDER (Edward B.). **Beriberi.**—viii + 427 pp. With 51 text-figs., 1 folding chart and 5 coloured plates. 1913. London: John Bale, Sons & Danielsson, Ltd. [18*s.* net.].

A review of this book appears on p. 332.

CLARKE (J. T.). **The Etiology of Beriberi.** [Correspondence.]—*Brit. Med. Jl.* 1914. Jan. 10. pp. 113-114.

The author discusses the infective theory of beriberi, and the arguments brought forward by STANLEY (see this *Bulletin*, Vol. 2, p. 602) and shows that they are refuted by the work of BRADDON, and of FRASER and STANTON, and also by the statistics given by FLETCHER of the Kuala Lumpur lunatic asylum and others.

P. W. B.-S.

GALT (W. S.). **The Etiology of Beriberi.** [Correspondence.]—*Brit. Med. Jl.* 1914. Feb. 28. pp. 512-513.

This is a personal protest against the acceptance of the rice-eating theory, the author having found twenty cases of beriberi in the port of London on board a Norwegian ship just arrived from South America. The crew had not used rice at all and the incidence was higher among the officers than the men. It is stated that no cases had occurred in the ship before and there was no overcrowding, but no other details are given.

P. W. B.-S.

ARNOLD (W. J. J.). **The Etiology of Beriberi.**—*Brit. Med. Jl.* 1914. Feb. 7. pp. 299-300.

The article commences with the statement that "in view of the widespread tendency to accept as proved that beriberi is due to eating decorticated rice it behoves those whose experience contra-indicates this theory to express their opinions." [It is evident that the author has not grasped the modern theory of the causation of beriberi, for no one now believes that *all* cases are due to ingestion of decorticated rice, but that a deficiency of the necessary factors (or vitamines) in a variety of foods may lead to the development of this disease.] The author appears to hold that the disease is infectious and is probably conveyed by ecto-parasites. He states that in endeavouring to trace the origin of cases on board ship he has never failed to find one at least of three circumstances: (*a*) The existence of beriberi in the ship on a previous voyage; (*b*) The presence on board of a member or members of the crew who had previously had beriberi; (*c*) some member of the crew who had recently sailed on a ship where beriberi prevailed, though he had not then had the disease himself.

[No fresh facts are brought forward and the arguments used are not convincing.]

P. W. B.-S.

PARKER (Herman B.). **A Report on Beriberi in the County Jail at Elizabeth, N.J.**—*U.S. Public Health Rep.* 1914. Feb. 6. Vol. 29. No. 6. pp. 339-341.

The author was sent to investigate a small outbreak of a disease which had occurred in the county jail at Port Elizabeth, New Jersey, U.S.A. He found three cases in hospital and three others in the jail suffering from a disease called "Jail Oedema," which he considered to be beriberi. One of the three hospital cases showed evidence of albuminuria and the knee reflexes were present; another with general symptoms of beriberi suffered from haemorrhage from the gums. No details as to the food or hygienic conditions are given. P. W. B.-S.

RICHTER (Hugo). **Zentrale Veränderungen bei experimenteller Beriberi der Taube.** [Changes in the Central Nervous System of Pigeons in Experimental Beriberi.]—*Zeitschr. f. d. gesamte Neurolog. u. Psychiat.* Orig., 1913. Dec. 23. Vol. 21. No 1-2. pp. 172-181. With 1 text-fig. and 2 figs. on a plate.

This paper is mostly devoted to the histo-pathological changes found in the central nervous system of five pigeons fed upon polished rice. Four died and one was killed 24 hours after its cure, which was brought about by giving it unpolished rice. The first pigeon died on the third day of the illness, and the changes in the nervous centres were not marked. The second on the fifth day received unpolished rice and was cured; in this one very marked changes in the central nervous system were found. In a third, which showed the most severe symptoms, the degenerative changes in the central nerve cells were most marked. Very full descriptions of the pathological changes are given; the areas most affected were groups of cells in the corpus bigeminum (optic lobe) on both sides, the large cells being swollen and vacuolated. The author states that the clinical symptoms and anatomical changes in pigeons are quite distinct from those seen in men who have suffered from beriberi, the etiological factor alone being the same. His view is that the disease is caused by a poison contained in the polished rice and that the anti-body is in the silver layer. His earliest observations on the affected pigeons led him to notice the cerebellar-like gait and movements. He gives the following conclusions: The clinical picture of experimentally produced beriberi in pigeons is that of a severe disturbance of the centre of gravity. There are marked hyperaemia and extravasations in the central nervous system, with progressive degeneration of the nerve cells. The causal connection between the symptoms of poisoning and a cell group, always severely affected, belonging to the sphere of influence of the cerebellum may be accepted. The histological conditions found resemble those morphological changes caused by various intoxications which are known to affect the central nervous system.

P. W. B.-S.

PRIEST (R. C.). **Some Observations upon Thirty-one Cases of Multiple Peripheral Neuritis amongst European Troops in India.**—*Jl. R. Army Med. Corps.* 1914. Feb. Vol. 22. No. 2. pp. 173-185. With sketch plan.

The author describes a disease of obscure origin which became

prevalent amongst the men of the 3rd Battalion Middlesex Regiment during the hot season of 1912 and the preceding year at Lebong, near Darjeeling. The disease was at first thought to be beriberi, the regiment having recently come from Singapore, but later the diagnosis was changed to multiple peripheral neuritis. Some of the men recovered completely after leaving the endemic area; others became chronic invalids and had to be sent to England. There were 31 cases. No evidence of alcoholism, syphilis, or metallic poisoning could be obtained, and the food supply was good. There seemed some reason for considering the disease to be infective, but no definite proof was obtained. The clinical symptoms were irregular anaesthesia, oedema, cardiovascular changes, diminished power of the lower limbs, and debility. The affection differed entirely from beriberi in that, firstly, the great majority of those affected showed normal knee jerks (21)—in others these were exaggerated, and in only two were they absent—secondly, there was neither general nor local wasting.

[This paper is especially valuable, as it points out very clearly that there is a group of conditions, not uncommonly present in tropical and sub-tropical zones, associated with symptoms of peripheral neuritis, simulating true beriberi in many features, but apparently quite distinct, about the etiology of which we are at present ignorant.]

P. W. B.-S.

Potter (T. J.). **Report on Peripheral Neuritis in Jamaica. With Comments by District Medical Officers.**—8 pp. 1913. Jamaica: Government Printing Office, Kingston.

Large numbers of cases of peripheral neuritis occurring in Jamaica have recently attracted considerable attention and different views have been advanced as to the nature of the disease. Potter, who now reports on these cases, believes that some are cases of pellagra, while others do not come under any well-recognised type.

The initial symptoms of the disease are, in the main, those met with in any case of peripheral neuritis—numbness, tingling, cramps, loss of power, etc., but in addition loss of hearing and defective vision have been noted.

Males and females would appear to be attacked in about equal proportion, but the disease does not appear to be common before puberty. It is commoner in the rural districts than in the towns, and occurs at all elevations in the island. Whole families have been reported to be simultaneously attacked.

As regards the diagnosis, there are no characteristic skin lesions nor mental disturbances as are found in pellagra. From beriberi the author states that the condition can be distinguished by the absence of oedema and of cardiac disturbances. Some even have regarded it as due to malaria but, as the author points out, if this were so, one would naturally expect to find the incidence greatest in the districts where malaria is most common, but this does not appear to be the case. Forms of neuritis similar to the above have not been noted in countries where malaria is as common as in Jamaica.

Potter believes that the disease resembles a condition described by Wellman in Central Africa as epidemic neuritis, but in that disease skin lesions do occur; no mention is made of eye symptoms or of deafness.

A synopsis of 35 cases is given, comments by district medical officers being appended. A variety of expressions, as to what the condition is due to, appears in these. Most agree that it is not beriberi. One believes that it may be due to alcohol or syphilis, while another correctly points out that the disease has no connection with pellagra.

[Further observations are evidently required upon this interesting condition; such symptoms have not, so far, been described in pellagra.]

G. C. L.

SCHAUMANN (H.). **Bemerkungen zu der Veröffentlichung von Casimir Funk: "Ueber die physiologische Bedeutung gewisser unbekannter Nahrungsbestandteile, der Vitamine."** [Remarks on Funk's Publication—The Physiological Significance of certain unknown Food Substances called Vitamines.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Feb. Vol. 18. No. 4. pp. 125-131.

The paper is controversial throughout and contains no new facts. The author maintains that he has isolated a variety of food substances from bull's testicle, wheat bran, etc., which exert a pronounced prophylactic and curative influence on the experimentally produced disease, and he still considers that a very marked anti-neuritic power must be ascribed to certain phosphorus compounds, though not to all these. He meets FUNK'S argument, that these properties are due to impurities of nucleic acid which have not been separated, by pointing out that even if this did occur, the amount remaining would be too small to have any effect, and that the nucleic acid is originally derived from phosphorous compounds. Schaumann states that he never ascribed the protective power in his substances to phosphorus itself, but only to certain undefined phosphorus compounds in which FUNK'S Vitamines exist in greatest quantities. He questions whether FUNK'S nucleic acid theory is right, but believes rather that the anti-neuritic property is present in a variety of compounds found in animal and vegetable life, the mother substance being more efficacious than any split off vitamine. He argues that as FUNK'S beriberi] vitamines have so far only been tried on birds (chiefly pigeons) with good results, other trustworthy experiments are required to establish their curative value. He then refers to the vitamines for scurvy prepared from lime juice, which had very little effect upon guinea-pigs and have not been tried on man. Vitamines which influence growth are stated by FUNK to differ from beriberi vitamines. Schaumann mentions ISOVESCO'S experiments* with substances derived from testicle, ovaries and cod liver oil, which are lipoid in character [the two former are probably hormones.]

At the conclusion Schaumann allows FUNK every credit for having been the first to isolate the anti-neuritic substance from rice-bran, but whether this substance, the formula of which has been changed, is pure, must be left undetermined for the present.

P. W. B.-S.

**Compt. Rend Soc. Biol.* 1913. Vol 75. pp. 393 & 445.

In a summary of the paper by VOEGTLIN and TOWLES—"The Treatment of Experimental Beriberi with Extracts of Spinal Cord"—printed in Vol. 2, p. 609 of this *Bulletin*, the authors' conclusions were quoted and commented on. Dr. VOEGTLIN writes that in the conclusions the words "yeast, nucleic acid" should have ran "yeast-nucleic acid." It was this substance, not yeast, which was found to have no effect on experimental beriberi, as is evident when one reads the body of the paper.

MISCELLANEOUS.

FRICKS (L. D.). **Rocky Mountain Spotted Fever. A Report of its Investigation and of Work in Tick Eradication for its Control during 1913.**—*U.S. Public Health Reps.* 1914. Feb. 20. Vol. 29. No. 8. pp. 449-461.

The author was detailed to make investigations upon Rocky Mountain spotted fever in Montana during 1913 and to co-operate with the Montana State Board of Health as to the measures necessary for its eradication from certain selected areas. As the site of his operations he selected the southern half of the Bitter Root Valley. Tick eradication measures and laboratory investigations had been carried out here two years previously.

Up to the present time the measures adopted for tick eradication have been (1) dipping of domestic animals in arsenical dips; (2) killing of wild animals within a limited area. The following dipping solution was used in the beginning of the season :—

Sodium carbonate (sal soda)	pounds	24
Arsenic trioxide (white arsenic)	,,	8
Pine tar	gallons	2
Water to make	,,	500

It was found, however, that this was not strong enough to kill the engorged female ticks, so various stronger solutions were tried. As the ticks are often found attached near the horns and ears of the animal it is difficult to reach them here with solutions, as submersion for long periods of time is not feasible. No money was at first available for the destruction of wild animals, but later in the season ground squirrels were attacked. Carbon bisulphide pumps, as used by the Public Health Service on the Pacific coast, were procured and experiments were carried out to see if the squirrels could be attacked while hibernating in their holes. Tick surveys were also carried out at various places.

As regards sheep grazing, so many factors enter into this method as a means of tick eradication that the value derived therefrom cannot be definitely decided until such experiments are carried out on a very large scale.

The author believes that the geographical distribution of Rocky Mountain spotted fever is much more extensive than is usually supposed. Letters sent out to the Health Officers of the different States resulted in the notification of cases resembling spotted fever, but in some of these the diagnosis was open to doubt. A list of these districts is given.

G. C. Low.

JOYEUX (C.). **Contribution à l'Etude des Nodosités juxta-articulaires.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 711-714.

Juxta-articular nodules were first described by JEANSELME in 1905 and after that were noted and studied in different parts of the world. FONTOYNONT and CAROUGEAU in Madagascar on examination of one of these nodules, which contained grumous pus and white grains, with mycelial filaments microscopically, concluded that the parasite belonged to the genus *Discomyces* and it was named *Discomyces carougeaui*. NEVEUX,

on the other hand, who examined what were apparently similar nodules in Senegal, found that they consisted of a fibrous centre and did not show any signs of a mycelium. MOUCHET and DUBOIS in the Belgian Congo have also observed numerous nodules which they believed to be of the nature of yaws. OUZILLEAU in the region of M'bomou believes that they are the cysts of *Onchocerca volvulus*. The author describes three cases which he has studied himself in Guinea. He finds that their microscopic structure differs from that described by FONTOYNONT and CAROUGEAU and approaches very closely that seen by NEVEUX. They consisted of a sclerotic tissue with inflammatory foci. Iodide of potassium cured them and the author believes that this is an argument in favour of their mycotic nature. He concludes that juxta-articular nodosities are a clinical syndrome brought about by different causes. G. C. L.

ROGERS (Leonard). **Gleanings from the Calcutta Post Mortem Records. No. viii (concluding). The Primary Causes of Death and the most frequent Errors of Diagnosis in 1,000 Medical Post Mortems.**—*Indian Med. Gaz.* 1914. Feb. Vol. 49. No. 2. pp. 41-45.

A table gives the percentage of deaths from tropical diseases; these were as follows:—

Fevers (Malaria 1·7, Kala-azar 9·1 and Plague 0·6)	11·4
Beriberi and epidemic dropsy	·4
Cholera	10·7
Dysenteries	10·5
Amoebic liver abscess	2·2
Total ..	35·2

This shows that a little over one-third of the total deaths taken from the Calcutta post-mortem records were due to tropical diseases.

Errors in the diagnosis of dysenteries were fairly frequent. For example, tubercular diarrhoea and simple diarrhoea were mistaken for amoebic dysentery four times, peritonitis twice, tubercular peritonitis, hepatitis, gangrene of rectum, intestinal obstruction, broncho-pneumonia, malaria, fever and anaemia, once.

As regards bacillary dysentery 12 out of 36 or one-third were wrongly returned, including five in which death took place within two days of admission. In four cases each simple diarrhoea and tubercular diarrhoea had been diagnosed, while in one each phthisis, acute yellow atrophy of the liver, cholera, remittent fever and meningitis had been suggested clinically. G. C. L.

HILL (Leonard). **The Working Power of the White Man in the Tropics and the Electric Fan.**—*Brit. Med. Jl.* 1914. Feb. 7. p. 325.

The author states that the electric fan has revolutionised the conditions for civilian work in houses in the Tropics. The rapidly moving air drives the stagnant atmosphere away and brings comfort and increased working power. Exposed to the sun however the white man is not comfortable nor happy doing field labour in the Tropics. His part is to organise and overlook whilst that of the dark skinned races is to do the manual labour. How far important out-door labour

could be made more possible, by the use of powerful fans, for white men is a matter, according to the author, for the engineer to determine.

G. C. L.

CHALMERS (Albert J.) & ARCHIBALD (R. G.). **Two Early Eighteenth Century Treatises on Tropical Medicine.**—*Proc. Roy. Soc. Med.* 1914. Feb. Vol 7. No. 4. (Section of the History of Medicine.) pp. 98-106.

A short description is given of the two works. The first treatise ("Traité des Maladies Particulieres aux Pays Orientaux, et dans la Route, et de leurs Remedes," by D. L.F.) forms the second or medical portion of Le Sieur Luillier's "Nouveau Voyage aux Grandes Indes," which was printed in Rotterdam in 1726. The authors have been unable to trace the writer's name, as he merely writes under the appellation of D. L. F.

The second treatise ("The Sea-Surgeon, or the Guinea Man's Vade Mecum," by T. AUBREY, M.D.) was printed in London in 1729.

In the oriental treatise dysentery, small-pox, snake bite, *bicho*, sea-sickness, scurvy and colic are described. There were three varieties of bicho peculiar to Brazil, the first obviously the guinea worm, *Dracunculus medinensis*, Linnaeus, 1758, the second the jigger, *Dermatophilus penetrans*, Guérin, 1838, the third epidemic gangrenous rectitis.

In the Sea-Surgeon's Vade Mecum, which was written primarily for medical men connected with the slave trade, diseases such as fevers (malaria), filariasis, diarrhoea and dysentery, intestinal obstruction and colic, quinsy and pleurisy are discussed.

The authors conclude by making some interesting remarks upon the two works.

G. C. L.

FRANCIS (Ernest E.). **What is Chaulmoogra Oil?** [Correspondence.] —*Lancet.* 1914. Mar. 7. p. 718.

The author writes to say that nearly all the so-called chaulmoogra oil upon the European market is spurious or adulterated. The true chaulmoogra oil is expressed from the seeds of *Taraktogenos kurzii*. In 1912 the crop of seeds of this plant having failed almost completely, an oil obtained from the seeds of *Hydnocarpus wightiana* was put on the market as pure chaulmoogra oil. The importance of this substitution is that, though similar in composition and appearance, the product from the *Hydnocarpus* has little therapeutical value in leprosy. The locality where *Taraktogenos kurzii* occurs is a limited one: the Chittagong Hill tracts, Burma and parts of Assam. Specimens of both of these oils have been forwarded to Mr. MARTINDALE, Mr. PARRY and Mr. SQUIRE in London.

[According to the Indian and Colonial Addendum (1900) to the British Pharmacopoeia (1898) chaulmoogra oil is obtained by expression from the seeds of *Gynocardia odorata*, but the matter of the exact source of the oil is still in an unsatisfactory condition. KING supports Francis in his assertion that the oil comes from the seeds of the *Taraktogenos kurzii*.]

G. C. L.

DENGUE AND UNCLASSED FEVERS.

GAIDE. **Note sur la Dengue en Annam-Tonkin.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Coloniales.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 1177-1181.

Dengue has been reported from this region since 1890, but it was not till 1905 that serious epidemics occurred. The author gives a short description of four of these. The first was imported to Haiphong from Cochin China in April 1905 by naval ships. It spread to the shore, affecting practically all the white population, military and civil, approximately 700 persons. The indigenous population was immune. The last cases were noted in January 1906. The second epidemic commenced in June 1906, affecting only the naval and military forces, and lasted till December. It was less severe than that of 1905, but gastro-intestinal symptoms were more marked, with fever, generalised pains and discrete eruptions. From Haiphong the disease spread to Nui-Deo, Tourane and Quang-Yen. In the third epidemic, which occurred in 1907, Haiphong was free, but the disease was very severe in Hanoi from October to November among the soldiers in the citadel, the natives being again immune. The fourth epidemic occurred at Hanoi, from July 1907 to February 1908, among the civil population; the disease was very mild and the rash was either absent or very slight. The course of the epidemics was very similar; they commenced with the hot weather and terminated quickly at the first appearance of the cold season.

P. W. Bassett-Smith.

ALFRED-KHOURY (M.) **L'Insuffisance Surrénale dans la Fièvre Dengue.** —*Bulls. et Mém. Soc. Méd. des Hôpit. de Paris.* 1913. Nov. 13. 3e Série. 29e Année. No. 32. pp. 498-499.

The author draws attention to the valuable work of Prof. de BRUN on dengue and to his researches at Beyrouth in particular, also to the work of SERGENT and others on supra-renal insufficiency in acute infections. In this disease the convalescence is so prolonged and the asthenia so marked that deficient secretion of these organs seemed to be probable. With this view he studied the last seven cases of an epidemic at Beyrouth in 1912, and though the numbers are small to dogmatise on, he draws the following conclusions. (1) The syndrome of deficient supra-renal secretion, if not constant, is at least very frequent in dengue fever. (2) The supra-renal asthenic condition is the chief characteristic. (3) The use of solution of adrenalin, xxx drops of 1/1000 solution given by the mouth, shortened the period of convalescence.

In this last epidemic grave cases of the disease were observed for the first time in Syria. P. W. B.-S.

DE LUCA (Michele). **Sulla Febbre dei Tre Giorni a Parghelia (Catanzaro).** [Three-day Fever in Parghelia (Catanzaro).]—*Malaria e Malattie dei Paesi Caldi.* 1914. Jan.-Feb. Vol. 5. No. 1. pp. 23-25.

A description is given of two epidemics of three-day fever which occurred during 1911–12 at Parghelia, in Sicily; the cases were

at first mistaken for influenza. The infection spread rapidly and soon cases were found throughout the buildings which had been occupied by the inhabitants since the earthquake of 1905. Out of a population of 2,500 there were about 300 cases, but undoubtedly many of the milder forms were not recorded. The author states that before 1911 no cases had been noted. With reference to the etiology, it is shown that during June and July the men of Parghelia communicated by boat freely with the coast towns of Palermo, Messina etc., and that in these places, which are infested by pappataci flies, the men contracted the disease and brought back both the virus and the flies to uninfected places. A description of the clinical course of the disease is given. Though the fever lasts only three days, yet it produces a marked debility for about 11 days, incapacitating the men from work, and as the infection continues from June to October there is a considerable monetary loss both to the person and the district. The author recommends that individuals should avoid the source of infection; that the government should cause the old partially destroyed houses to be properly rebuilt; that the defects in the streets be made good, the water supply improved, and general hygiene with regard to human and animal refuse attended to.

P. W. B.-S.

NICOLAS (Ch.). **Quelques Cas de Fièvres d'Origine indéterminée simulant le Paludisme en Nouvelle-Calédonie.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 133-136.

During a stay of three months at Bourail, the most thickly populated district of New Caledonia, cases of fever simulating malaria were seen, but the author was never able to find any anopheline mosquitoes or parasites in the blood of the cases. The clinical course of four cases is given, more or less in detail. In the first an infant showed signs of tuberculosis and did not respond to quinine; the second, aged 28, had an irregular intermittent fever which responded to quinine; the third, aged 18, came from a district where many were attacked with fever of a typhoid type. The fourth case was interesting, at first like severe typhoid with haemorrhages, large spleen and diarrhoea, but with a negative Widal reaction. The fever terminated by lysis but relapsed, when the spleen became enormously enlarged. No parasites could be found and splenic puncture gave negative results. As there was no improvement under quinine treatment, and a fatal result was feared, a 30 mgm. dose of neo-salvarsan was given intravenously, which caused a rapid improvement, and after a second dose the cure was completed. Cases of this local fever are said to be common, but as the author was unable to find evidence of malarial parasites he does not feel justified in describing the disease as malaria.

[Much more clinical and laboratory research is required to establish the identity of the disease or, as it would appear, the various diseases met with in this area.]

P. W. B.-S.

CONOR (A.). **Sur Quelques Nouvelles Observations de Fièvre Boutonneuse.**—*Arch. Inst. Pasteur de Tunis.* 1913. No. 1/2. pp. 116-117.

The author calls attention to some other cases of "Fièvre Boutonneuse" or macular fever, a condition first described as a special entity by himself and BRUCH. Reference is made to cases seen by GABBI in Tripoli [see this *Bulletin*, Vol. 2, p. 109] and also to a case mentioned by BALFOUR in a soldier at Khartoum. Finally MACNAUGHT in South Africa has seen a fever distinct from typhoid and paratyphoid and also from dengue, typhus and pappataci fever, which has the following characters and is probably an example of macular fever: Rapid onset, gastric distress with constipation, pain in the limbs, generalised eruption specially localised on the palms of the hands and soles of the feet, fall of temperature in ten to fourteen days, with rapid convalescence without relapse.

[Further observations on this fever from other parts of Africa should prove of value.]

G. C. L.

In the summary of the paper by SMITH, LYNCH & RIVAS, "On the Transmissibility of the Lepra Bacillus by the Bed-Bug," (this *Bulletin*, Vol. 3, p. 187), it was implied, as in the original paper, that NUTTALL was responsible for the suggestion that bugs deprived of their antennae will feed on anything. This suggestion was in fact HINDLE and MERRIMAN'S, whose article is quoted on page 188 of that number.

BOOK REVIEWS.

FUNK (Casimir). **Die Vitamine: ihre Bedeutung für die Physiologie und Pathologie mit besonderer Berücksichtigung der Avitaminosen: (Beriberi, Skorbut, Pellagra, Rachitis). Anhang: Die Wachstumsubstanz und das Krebsproblem.** [The Vitamines: their Physiological and Pathological Significance especially with regard to the "Avitaminosen" (Beriberi, Scurvy, Pellagra and Rickets). Appendix: The Growth Substance and the Cancer Problem.]—viii+193 pp. With 38 text-figs. and 2 plates. 1914. Wiesbaden: Verlag von J. F. Bergmann. [Mk. 8. 60.]

This volume deals with a group of diseases—Beriberi, Scurvy, Pellagra and Rickets—in which it is assumed that the etiology depends on the absence from the food of certain essential substances named by the author "Vitamines". A very good account of the clinical symptoms associated with these diseases, together with a general survey of the distribution, etiology and other important data are given. At the end of each chapter an up-to-date bibliography of the literature greatly enhances the value of the articles. The etiology of these diseases, however, is still to a great extent unknown, and it is at least premature to include them all under the term "deficiency diseases." In order to review the claims advanced by the author, it is necessary to consider the state of the subject prior to Dr. Funk's investigations. As long ago as 1897 EIJKMAN showed that polyneuritis of fowls, induced by a diet of polished rice, could be prevented by the addition to the diet of the rice cortex. He found that the active substance contained in the cortex was dialysable and not precipitated by alcohol. These observations were corroborated later by various observers, and in 1910 FRASER and STANTON made an attempt to characterise the substance more closely. They ascertained that the active substance was soluble in strong alcohol, and that an alcoholic extract was capable of curing fowls suffering from beriberi. In 1911, when Dr. Funk undertook his investigation, the above facts were known and on this basis he set out to discover if possible the chemical nature of the substance. He claims to have done so and gave formulae—differing in different papers—for the supposed substance. This part of the subject being purely chemical need not be discussed here, but the evidence brought forward in support of this claim is not sufficiently convincing for any chemist to accept it. One is therefore forced to the conclusion that the isolation and identification of the active substance in beriberi remains for the future. Dr. Funk has shown, in extension of the work of EIJKMAN, FRASER and STANTON and others, that the substance is precipitated by reagents which precipitate bases, but has in the reviewer's opinion failed to isolate it in a pure state. We are therefore in much the same position as we were years ago, though the fact that the unknown substance has been dignified by a name—"Vitamine"—has helped to focus attention on the subject.

The present position of the etiology of beriberi and scurvy leaves no doubt that these diseases are due to the lack of some necessary substance in the food, and that this substance is capable of acting in minute quantities. In pellagra, however, the question is by no means settled, and while future research may bring its etiology into line with that of beriberi, no unbiassed mind can at the present time afford to neglect other possible factors. The same remarks apply to rickets, the cause of which is quite uncertain. Speculation in such cases is quite justified, and is often useful in opening up new lines of research, but great care should be taken that such speculation is not put forward in such a way as to convey to the reader that he is dealing with ascertained facts.

A chapter on growth and the cancer problem closes the book. Lately it has been shown by various observers that small quantities of certain unknown substances are necessary for growth in animals. None of these observers, however, were able to ascertain the chemical nature of these substances, but Dr. Funk states that they are vitamines. In view of what has already been said as to the position of "vitamine," it is obvious that

this does not add much to our knowledge of the subject. The book abounds in statements which are based on nothing more than hypotheses and speculation, and while there is a good deal of useful information and suggestion it would be more scientific not to assume ideas as facts until they have been experimentally proved as such. A number of good photographs of beriberi and pellagra in man and animals are given.

Leaving out of account the controversial claims advanced by the author for the isolation of "vitamine," the book can be recommended as furnishing a good general account of the diseases mentioned. In this regard it should prove useful to the student interested in these problems.

H. MacLean.

VEDDER (E. B.). [A.M., M.D. Captain Medical Corps, U.S. Army.] **Beriberi.**—viii + 427 pp. With 51 text-figs., folding chart, and 5 coloured plates. 1913. London: John Bale, Sons & Danielsson, Ltd. [18*s.* net.]

This excellent book has appeared at an opportune time for, as the author states in the preface, the subject of beriberi has been in hopeless confusion for years and though a mass of literature has of late accumulated, there is no book written in English which has been published since BRADDON'S work of 1907. The author has personally studied beriberi both from its clinical and experimental side and is well qualified to form opinions on the large amount of research work that has been carried out, and he naturally puts forward his own views in the strongest and most convincing way, as seen in his definition of the disease. "It is a disease resulting from faulty metabolism *usually* only seen in those persons who eat rice as the staple diet, and is directly caused by the deficiency of certain vitamines in food." In the 416 pages there are sixteen chapters, dealing with the history, pathology, symptomatology, rice and its preparation, the etiology of the disease (six chapters including polyneuritis in fowls and beriberi in animals), infantile beriberi, ship beriberi, epidemic dropsy, theoretical and practical considerations, with a very good bibliography and an appendix.

In the description of the disease he states that there is no definite distinction between wet and dry beriberi, though his own view is that there are differences, but these are not sufficiently known to make it advisable to establish a distinction; also in the discussion of the etiology, the probability of there being several forms of vitamines, both preventive and curative, is shown to be supported by evidence. He discusses very fully the infection and intoxication theories and shows how neither can explain the presence and distribution of the disease, and that facts gathered from all sources substantiate the deficiency theory, so strongly advocated by EIJKMAN, FRASER, STANTON, GRIJNS, HIGHET, and many others. He considers that polyneuritis gallinarum and human beriberi are etiologically the same disease, though the cardiac manifestations found in man are not present in fowls. The actual deficiency is not a phosphorus compound as thought by SCHAUMANN, but is probably a base derived from nucleic acid which is rapidly destroyed by treatment with fixed alkalies. The exact composition of this base is at present unknown, several formulae having been given by FUNK, EDIE, EVANS and others. Probably there are several active substances which are essential in the diet of birds, man and some other animals, acting in very minute doses. These for want of a better term are called vitamines. In the practical considerations the necessity of concerted action by an International Board is strongly supported, followed by legislative measures, and the education of the people on the importance of avoiding the use of polished rice. Without this there will be little chance of stamping out the disease in large communities, as has been done so successfully in the government establishments in the Philippines and the Malay States. The book is very well illustrated and should be carefully read by everyone who is interested in the subject.

P. W. Bassett-Smith.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 7.

APPLIED HYGIENE IN THE TROPICS.

By Colonel W. G. KING, C.I.E., I.M.S. (Retired).

REPORTS.

SOUTHERN NIGERIA.

*The estimated population is 8,248,536. The death rate of European officials, who numbered 2,068, amounted to 11·12 per mille. In Lagos the death-rate of the general population was 29·9 per mille, as contrasted with 37 in 1909, 35.8 in 1910, and 30·7 in 1911. Infantile mortality was at the rate of 225·3 *per mille* of births!

The prevailing diseases are malarial fever, dysentery, tuberculosis, and ankylostomiasis. Leprosy, filariasis, and blackwater fever are also found.

In the Eket District, 149 cases of a mild form of human trypanosomiasis were found; pigs and dogs were also found infected with trypanosomes. In pigs the disease is "particularly fatal," whilst in human beings the tendency to cure is pronounced, and it "does not apparently assume an epidemic form." Dr. FORAN is quoted to the effect that the disease has existed in the District for "perhaps centuries," and that formerly natives enforced their own laws, requiring segregation of the human being. There has now been established an isolation camp, ten miles from Eket. Here fly-proof sheds have been provided. In the "why and wherefore" of this mildness in attack or, say, the comparative immunity of the native to this form of trypanosomiasis, those investigating sleeping sickness may, we suggest, find matter of interest either in epidemiology or therapeutics.

The London School of Tropical Medicine was able, as a result of investigation by Dr. LEIPER, to add to its list of scientific successes in the identification of *Chrysops dimidiata* and *C. silacea* as being the intermediate host and carrier of *Filaria loa*.

*SOUTHERN NIGERIA.—Annual Medical Report for the Year ending December 31st, 1912. [Principal Medical Officer, W. H. LANGLEY; Senior Sanitary Officer, ARTHUR PICKELS.]—134 pp. f'cap. 1913. Printed by Waterlow & Sons, Ltd.

C. 27. Wt.P.10/46.—10/3/14. 2,000. 4/14. B. & F. G. 11/4. A

Sanitary Works.

The total expenditure on sanitary works amounted to £14,068. To this might be added £8,384 expended for laboratory purposes in the interests of sanitary research, and the sum of £920 from Native Court Funds for general sanitation. Taking the available figures of gross public expenditure as recorded for 1910 (viz., £1,592,282) this would represent 1·5 per cent. on account of sanitary advance, which contrasts favourably with the proportion allotted in the neighbouring colony of Sierra Leone.

The amount quoted against sanitary works was expended by the Public Works Department on drainage, reclamation, excavation, and mosquito-proofing. No details are given in the Report of the particular methods employed or the physical results achieved; nor is it specifically stated in what particular areas the improvements were made. Were such information supplied, and the dates of the works added, it might be possible to gauge their anti-malaria value by the mosquito or splenic indices which are duly afforded for various localities. This portion of the Report leaves the impression that there is an absence of that co-operation of the Public Works Department with the Sanitary, which makes for success and economy in applied hygiene. The wider view that must be taken of public matters under the new regime, following the union of Northern and Southern Nigeria (administered by a Governor-General), will doubtless favourably affect this subject. The absence of very close community of efforts between the sanitary and engineer authorities, for example, in connection with the present assembly of labour for the new Nigerian Railway, might be fraught with losses affecting both life and finance.

Prison Hygiene.

On the sanitary condition of prisoners, the Senior Sanitary Officer makes the following statement:—"Considerable work has been done to render the general sanitary condition of many of the prisons more satisfactory. There is no doubt that much improvement has been brought about; yet it will be observed that in some instances the ventilation area per prisoner is very greatly below even the lowest standard which can possibly be adopted." On referring to page 130 of the Report, there is found a table giving "the average cubic space per cell per prisoner," "average ventilation area in cells per prisoner" and "average prison area per prisoner." To quote figures under the last item doubtless has at times its sanitary utility; but, as there is nothing to show whether the square area of gardens, guard and other adjunct buildings are included or excluded, they are of little value. The cubic space column reveals such inadequate amounts as 215ft., 172ft., 217ft., 104·7ft., 164ft., etc., per head. As the square cell area available is not quoted, it is possible that in practice, with reference to "available" air-space in relation to height, conditions may be better or worse than those figures show; and it would therefore be desirable in future returns for figures as to cell square area to take the place of the first column (Prison area) or to supplement it. As they stand, however, the figures fully support the Senior Sanitary Officer's advice that improvement should be given effect to at an early date. By way of comparison, it may be said that out of 45 prisons quoted in the Table, only six possess the very moderate standard of cubic space

allowed by the Government of India for Indian prisoners in healthy non-malarious districts; only one reaches the standard allowed in an unhealthy district.

Anti-malarial measures.

The mosquito indices, in 1912, of certain inhabited areas compare favourably with those of 1911. Thus in Lagos and Ebute-Metta the indices declined from 13·1 to 5·04. For the whole province the decline was from 11·1 in 1911 to 5·06 in 1912. This may be in some measure the result of anti-mosquito measures; but, on referring to the Report of 1911, it is found that, if the meteorological results for localities there mentioned be compared with the same for 1912, in Brass only was there more than equivalent rainfall. In the remaining five areas, the rainfall of 1912 was in the total 47 per cent. less than that of 1911; a factor which may have largely influenced the favourable result. In the course of anti-malarial work, there were 794,060 "houses inspected"—a phrase probably implying not a single inspection of each house, but the total number of times certain houses had been inspected. Consequently, when it is stated that in 40,245 instances "houses with larvae" were found, the deduction that only 5 per cent. of the premises held larvae does not convey much information as to the extent of persistent sin in this respect in certain of the total.

In the whole Province, nearly 2,813 acres were cleared of grass as an anti-malarial measure. Remarkably little attention was given to "oiling." Although the 19 men employed on this duty for the whole Province in 1911 had been increased to 47 in 1912, the oiling of pools and excavations amounted to only six more in the latter than in the former year, whilst the drains oiled were less than twice the number; but here, again, the question of repetition confuses the issue as to the actual number of drains attended to. The Senior Sanitary Officer deprecates the slow progress made in mosquito-proofing of houses, and adds (apparently referring to public quarters), "as yet neither sanitary officer has been provided with an opportunity of practising what he preaches on this matter."

The Lagos Municipal Board are obviously exhibiting less energy in mosquito reduction than might be anticipated, having regard to the efforts made under Sir Wm. MACGREGOR, and to not only still existing malaria but the recent presence of yellow fever, for in this connection the Senior Sanitary Officer states:—"In Lagos itself there are about 500 wells. 101 are public and are maintained by the Lagos Municipal Board, but only 19 of these are mosquito-proof." [!]

SIERRA LEONE.

*(1) *Medical Section.*—In Freetown continued anti-malarial measures show influence, as judged by dispensary statistics. In 1910, the malarial fevers treated numbered 1,207. They declined in 1911 to 1,056, and in 1912 to 967. In the Protectorate there were eight cases of blackwater fever and three in Freetown. Notwithstanding the presence of plague and yellow fever in the neighbouring French possession, there were no attacks in the Colony. Quarantine measures were employed against both

*SIERRA LEONE. Annual Report on the Medical Department for the Year ended 31st December, 1912. [(Acting) Principal Medical Officer, J. W. COLLETT; Senior Sanitary Officer, R. H. KENNAN].—88 pp. f'cap. With photographs, charts and plans. 1913. Printed by Waterlow & Son, Ltd., London.

diseases. Twenty cases of smallpox "were reported" and 122 cases of yaws. In the presence of defective reporting, these figures probably are incomplete.

There were 230 European officials; the invaliding rate was 17·3 and the death rate 17·3 per mille.

The death rate amongst natives in the Colony was 17·7 and the birth rate 14 per mille. In Freetown the death rate was 22·1 and the birth rate 17·62. The total deaths of infants in Freetown decreased from 471 in 1903 to 268 in 1912.

In the gaol hospital, in October, there were 32 cases of beri-beri with 4 deaths, 20 cases remained in hospital at the end of the year. "Uncured" native rice was employed.

In the Koinadugu district at Kaballa goitre is "extremely common." In one native town, where "latrine bush" occurs on both sides of the stream used for the water supply, almost one quarter of the inhabitants appeared to have enlarged thyroids from definite goitre. "Two cases of leprosy and Madura foot respectively were found on patrol." Yaws is fairly common. Three cases of "suspicious trypanosomiasis" were reported on.

This section ends with a note by Dr. J. W. Collett, in which, whilst recording no imported yellow fever, he points to the importance of possible atypical and autochthonous cases, and quotes apparent instances reported by himself and Dr. McConaghy. He urges the necessity for detailed enquiry—not by a hasty Commission, but by an expert who would reside several months in a native town, gain the confidence of the population, and thus secure access to material.

(2) *Sanitary Section.*—During the year, the Freetown Municipality was relieved by Government of the task of scavenging, sanitary inspection, and building inspection and regulation, whilst it was left with the control of markets, slaughter house, cemeteries and waterworks. The Sherbro Municipal Board was dissolved, and the District Commissioner was saddled with its duties. In the Sanitary Department, Mr. H. Simms was appointed Sanitary Engineer.

The reconstruction of roads to prevent hollows for the accommodation of puddles, and "to some extent" the canalization of streams, as advised by Sir R. Ross and his co-workers of the Liverpool School of Tropical Medicine Malaria Expedition in 1899, are still in process of completion. The securing of an Ordnance Survey of Freetown has been sanctioned, and must prove a valuable adjunct. An intercepting drain as advised by Professor Simpson, to aid the drainage of land sloping from the mountains, is said to fulfil its work well, and its extension is advised. "Soakaway pits" near water standpipes are stated to act efficiently in preventing pools of water. The splenic index in 1,150 boys and girls examined was 24·08. Fines for "police and larvae cases" yielded £60 2s. 6d.

Bonthe is a town that flourishes on a map drawn up for town planning in 1870, but mere outlines actually exist. The place is represented by dwellings separated by swamps, through which it is being attempted to run roads.

In administration, advance has been made by the ruling that before a house is built the ground shall be inspected and approved by the Medical Officer of Health. It is suggested that in 1913 steps will be taken to supply towns in the Protectorate with "good wells" in lieu of mere water holes now used by natives. This Section of the Report ends with the recommendation that a whole time Health Officer be appointed for Freetown.

Anti-malarial measures in Freetown.

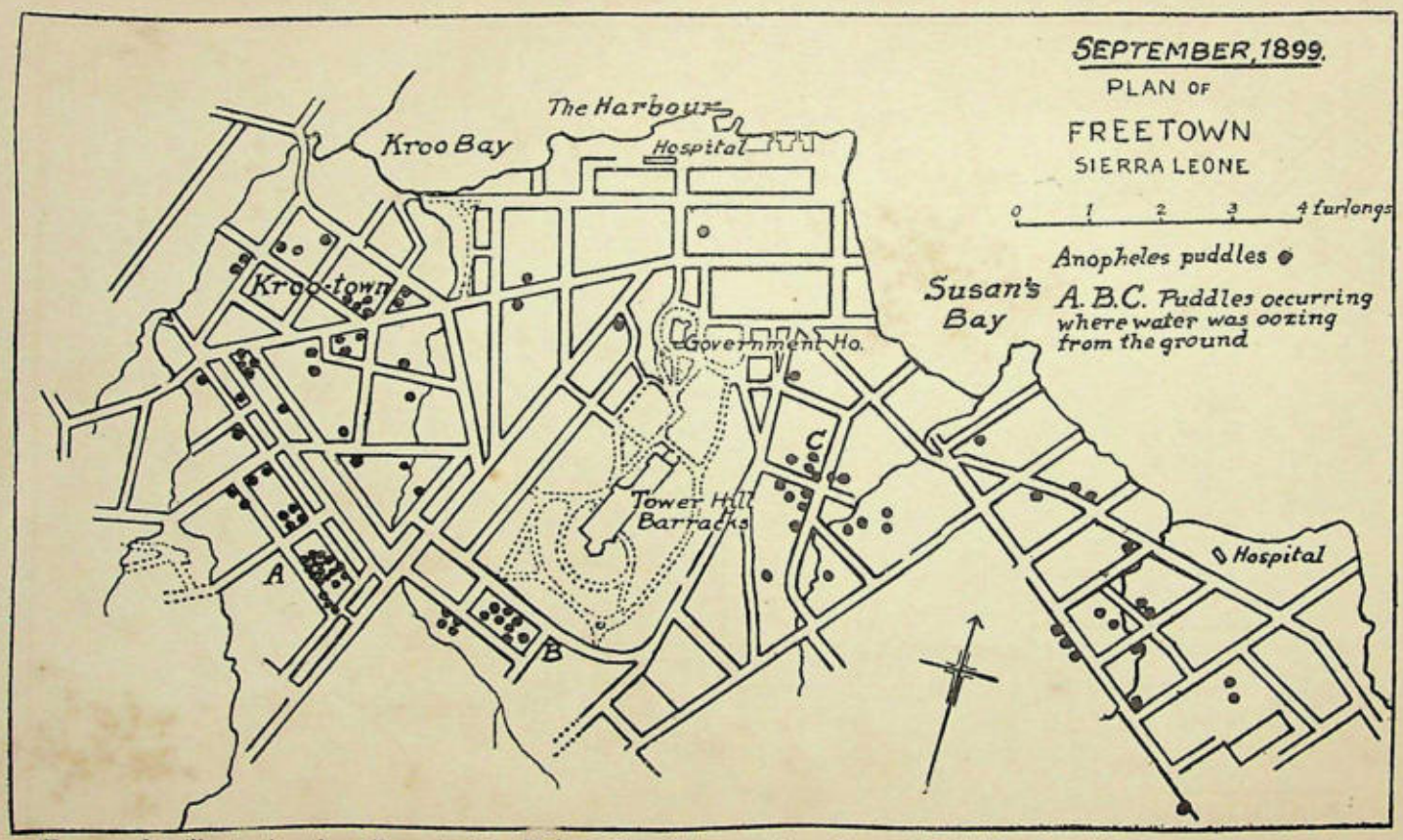
Having regard to the fact that Freetown, Sierra Leone, was the scene of the first application on a large scale of "mosquito reduction" as an anti-malarial measure, under the personal advice of Major (now Sir Ronald) Ross as far back as 1899, a report on the sanitary condition of that town in 1912 is of peculiar interest. That similar measures since instituted, on the principles then propounded by him,

plus a general advance of other sanitary efforts, have proved of vast utility in saving European life in West Africa generally, statistics amply prove.* A death rate for European officials of 75·8 per 1,000 on the Gold Coast, and 53·6 per 1,000 at Lagos between 1881–1897, now contrasts with rates which some European cities might envy, were constitution of populations and the saving grace of invaliding ignored. But, when attention is concentrated upon Freetown, although there is reason to believe much benefit has been reaped by the population, it is difficult to obtain statistical proof of such an opinion. In the neighbourhood of Freetown, if the West African Troops, who are of indigenous races and show much immunity, be excluded, and the statistical returns for European and West Indian Troops be relied on, the admission rate for malarial fevers is still excessive. The military authorites are of course responsible in these instances; but they plead that infection probably occurs when Freetown is visited by the men. As Freetown possesses medical institutions, and a municipality by which birth and death registration is conducted, it might be supposed the " tu quoque " argument ought to be easily disposed of. These municipal statistics cannot however be accepted unreservedly. Tho total death rate in 1912 is stated to have been 22·11 per 1,000, and the birth-rate 17·21. This birth-rate is ultra-modern for races as found in Freetown; it was even less in 1911, being then but 14 per 1,000. It is unlikely that the death-rate of 22 per mille is the full total, if associated with an infantile death-rate of 201 per mille of births, which the report records. However, if they are taken for what they are worth, it is found that the death-rate, instead of showing a consistent improvement, has fluctuated; so that from 1901–1907 the figures were, successively, 28·9, 24·9, 23·9, 26·9, 29·6, 23·6; in 1907, 27; in 1911, 21 per mille.

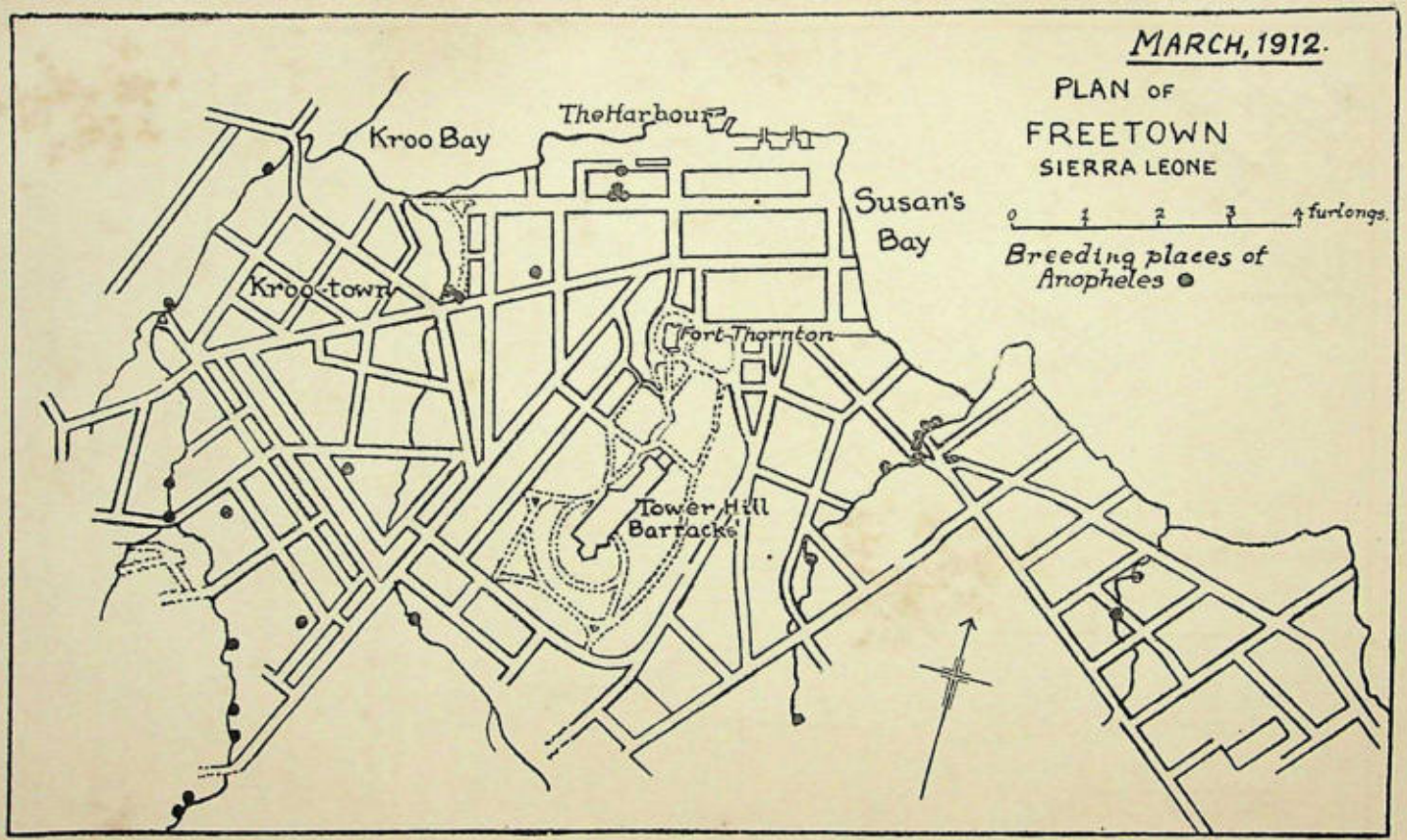
If the Medical returns be trusted to, it is capable of being shown that, between 1910–1912, malarial fevers treated in hospital declined from 1207 to 967. But medical returns may exhibit a falling off in attendance from other than permanent removal of causes of malarial fever spread. For example, it is suggested that, during the last decade, there has been a diminution of rainfall, whilst, in any case, such returns fail to distinguish between residents in the town and its surroundings. The percentage of malarial fevers for a series of years of total deaths registered, *plus* meteorological data, might have been helpful. Available figures however show that, in 1906, the percentage was 13, in 1910, 13, and in 1912, 16. The necessity for creating a trustworthy standard for future comparison was first recognized by Dr. DANIELS in 1901.† He suggested the use of splenic enlargement of children of fixed ages; but it was not till 1911 that such information was required by the Colonial Office, for incorporation in the Annual Medical and Sanitary Reports. In the case of Freetown, in 1911, the splenic index found on examining 1,149 school children was 16 per cent; but, in 1912, examination of 1,150 children gave 24 per cent. In the latter year house compounds showed a variation of mosquito infection from 2·4 to 15·5

*See *Lancet*, 1912, May 18, page 1356, and 1912, Sept. 14, page 776.

†First Progress Report of the Campaign against Mosquitoes in Sierra Leone (1901). *Liverpool School of Trop. Med. Memoir* 5, Pt. I.



(From a plan illustrating the "Report of the Malaria Expedition to Sierra Leone (1899)" by Ronald Ross, D.P.H., M.R.C.S. H. E. Annett, M.B., D.P.H., & E. E. Austen.—*Liverpool School of Trop Med. Memoir* 2.)



(From a plan illustrating the "Annual Report of the Medical Department [of Sierra Leone] for year ended 31st December, 1912.")

per cent. according to month and season. No statement as to malarial parasite index appears in the Report.

Not only are available statistics unsatisfactory, but the information at disposal since 1899 leaves the impression that anti-malarial measures have not been conducted from year to year with uniform vigour.

Indeed, Dr. Logan TAYLOR* reported that "even after one year's scavenging of their town, the Freetown authorities do not seem to be the least inclined to begin and do it for themselves." The Senior Sanitary Officer, in the above Report, thus summarizes the work done in the interval: "Since then (1899), something has been done in canalization of the principal streams, and most of the roads which were criticised by the expedition have been top-dressed and do not now retain water in holes on their surface, but the drains remain in much the same condition." He gives a map showing the breeding places of anopheles in the dry season, and he suggests contrast with the spot map prepared by the First Liverpool Tropical School Expedition, which showed conditions in the *wet* season (pp. 338, 339). As might be expected, large pools are more numerous in the map of the Expedition; but the present *dry* season map exhibits the peculiarity of the anopheles pools being found at the periphery of the town to the exclusion of the central area, whilst they occur just as readily at the head of a stream bed as at the points of discharge towards the sea. This would at least suggest that, if conditions have been improved in the central part of the town so that pools are less frequent there, either too little attention has been paid to the periphery, or invasion of pools by anopheles has occurred from areas surrounding the town; that is, the condition of land beyond the immediately inhabited area has not been sufficiently attacked—a possible sequence of the fact that authority over the land is divided between the military and civil administration.

As for actual measures taken, much of the attention paid in past years within the town has been more suitable to the reduction of the culex and stegomyia than the anopheles; and it is suggested that Freetown reaped the advantage by being well prepared to resist yellow fever during the outbreak of 1910. Dr. DANIELS, in his report just referred to, calls attention to areas beyond the town possessing numerous springs, for example, near Mount Aureol, Grassfield District, Wilberforce Barracks and Kissy and, besides, refers to unprotected wells and latrine pits within private premises in the town. Evidently, also, the attention of Professor SIMPSON was arrested as to the surroundings of Freetown; as, on his advice, an intercepting drain has been made for diversion of surface and subsoil water from Brookfields, and the Senior Sanitary Officer urges its completion. A photograph of this drain, attached to the report, shows a lively subsoil discharge at scattered points; but the uphill area exhibits the surface water standing in pools close up to the margin of the drain—a matter that should be capable of remedy by grading the surface, or making surface drains discharging into the intercepting drain. This, then, is the limit of action in the environs of Freetown, if the occasional clearings of ground by the military, in the immediate vicinity of their barracks, be excluded.

*Second Progress Report of the Campaign against Mosquitoes in Sierra Leone (1902). *Liverpool School of Trop. Med. Memoir* 5, Pt. 2.

The tables attached to the report, as required by the Colonial Office, should be of utility in showing details of sanitary and anti-malarial work performed within Freetown. But their perusal shows that of 92 houses occupied by Europeans, none are mosquito proof; that the excreta of the population removed daily from the town is a poor fraction of the total; that both public and private latrines are below requirements; that faecal cess-pits abound; that of 495 wells only 11 are mosquito protected; that no new public drains were made during the year; that no excavations or low-lying lands were filled up; that only five men were employed in oiling pools and drains for mosquito reduction. The tables show that 18 inspectors are employed, or about one for every 2,000 inhabitants; yet the total compounds inspected per working day per year did not exceed 15 per head. Neither huts nor compounds present areas that would justify this slender outturn of work; and it certainly would not have added materially to the duties of these men to undertake the checking of vital statistics as a routine duty when visiting premises on anti-malarial work, and thus materially aid birth and death registration.

Irrespective of division of authority between the civil and military outside Freetown, the report shows that whilst the municipality controls markets, slaughter houses, cemeteries, water-works, public lighting, and tax-collection, the Government have assumed the duty of scavenging, sanitary inspection, building inspection and regulation—*imperium in imperio*!

We have entered into the above details in support of the Senior Sanitary Officer's recommendation for the appointment of a whole-time Medical Officer of Health for Freetown, as a step towards securing that the first British anti-malarial measure founded on Ross's discovery should no longer be allowed to have an indefinite sequel, as a result of divided counsels and spasmodic and incomplete methods.

To the Sanitary Officer's proposal, however, we would add the rider that, prior to the appointment of a health officer, a special agreement should be entered into by the Military and Civil authorities, so that not only Freetown but its surroundings should be sanitarily surveyed by an anti-malarial specialist, to whom should be attached an intelligent engineering subordinate. Thus armed, a specialist could produce a complete scheme and estimate. A Medical Officer of Health could follow for maintenance on completion of the works.

An obvious objection to such a scheme must be "lack of funds." But the "saving [!] from the authorized expenditure of the Sanitary Department" of £2,279, allows room for belief that with the impetus afforded by the presence of a special officer such failure of use of funds need not occur in future—even if re-allotment owing to unexpected incidents were necessary—and that the raising of a loan for permanent sanitary improvements should be feasible. Locally, it is possibly appreciated that the recent placing in the market of a loan for a million pounds by Sierra Leone, of which 93 per cent. lapsed to the underwriters, might have gone off more brilliantly had the Colony a better fame for health. Again, the military authorities might see in the probable decrease of the present invaliding rates a ground for a solid contribution, whilst a healthy port should appeal to the civil administration as a desirable asset. The total exports in 1889—the period of the first Liverpool Expedition—were valued at £366,000; by 1910,

the value was £1,249,367—an increase that might reasonably be connected with a considerable grade of improvement of the health conditions of the Colony, which should encourage to further and more radical sanitary measures. The actual expenditure for sanitary purposes of the revenue of the Colony in 1910 did not amount to one per cent. of the total; notwithstanding other urgent demands upon the funds of the Administration, a greater contribution than this would seem reasonable.

Uganda.

*(1) *Medical Section.*—The population of the Protectorate, according to the census of 1911, amounts to 2,840,468. Calculated, necessarily, on figures resulting from incomplete registration, the death-rate was 21·5 and the birth-rate 24·2 per mille. Of the total admissions amongst Europeans for medical treatment, 36 per cent. suffered from malarial fevers, 1·04 from blackwater fever, and 17 per cent. from diseases of the digestive system. Amongst natives there were 932 deaths from sleeping sickness (against 1,487 of the previous year), 519 from small-pox, and 289 from measles. According to native Returns there occurred 3,100 deaths from plague, the area chiefly infected being Bukedi. Undulant fever, relapsing fever, and venereal diseases are important causes of morbidity amongst natives.

(2) *Sanitary Section.*—The Medical Sanitary Officer assumed office in July 1912 and, before proceeding to offer advice, very rightly devoted much time to gathering various data and existing rulings affecting sanitary administration. During the year, local sanitary committees were appointed for six townships, and for the first time the local Medical Officers concerned had a share in the general sanitation of their respective townships. These committees are composed of the medical officer and district engineer as members, with the district commissioner as President; the latter officer retains executive authority. Subsequent to the constitution of these committees they were given the power to condemn Government buildings, subject to the concurrence of the Medical Sanitary Officer. At one of the townships (Jinja), independent of the local sanitary committee, a number of traders, of their own option, formed a Committee which undertook night-soil and rubbish conservancy, *at their own expense.* In Mission Schools and amongst police units elementary hygiene is taught.

Under Ordinances ordinarily applicable, a further area in the Western Province was proclaimed infected with sleeping sickness. Kisumu, in British East Africa, and Naruboyu, on Lake Chioga, were declared infected with plague; enteric and cerebro-spinal fevers were included as infectious diseases, and syphilis was declared "a dangerous disease." Draft laws regarding the latter disease are to be placed before the Colonial Secretary for sanction.

Under the licensing of trades subject to a Medical certificate, manufactories of soda-water were included. By a Committee representative of Law, the Civil Administration, the Sanitary Department and the Department of Public Works, draft rules were formed dealing with the whole range of administration in urban sanitation, including anti-malarial measures. In consultation with the Department of Public Works, official dwellings have been improved as to ventilation and orientation. In the sphere of town planning, rulings were obtained as to "sanitary lanes" (scavenger lanes) behind plots and as to "open spaces." The question of keeping the European residential quarters apart from those of Asiatics and Natives was borne in mind.

Against malaria the usual minor measures were effected "in the principal stations" by gangs of from six to twelve men in each. In the

*Uganda Protectorate. Annual Medical and Sanitary Report for the Year 1912. [Principal Medical Officer, A. D. P. Hodges; Medical Sanitary Officer, C. J. Baker].—76 pp. f'cap. 1913. Printed by Waterlow and Sons, Ltd., London Wall.

dwellings of officials wire netting was employed, and in the barrack of the Indian contingent both wire netting and bed nets were used. Under major measures, the already accomplished draining of swamps at Masindi, Hoima and M'Bale was maintained with good results. At Kampala the draining of the Nakivubo swamp, which is regarded as a necessary work, has been treated spasmodically, owing to "lack of funds."

Against sleeping sickness extensive clearing of fly-infested jungle and removal of 14,000 people has been effected, so that, with the exception of a portion of the White Nile, all the principal trade routes may be said to be now "free of infection." The Medical Sanitary Officer, however, holds that the disease is not stamped out. He states, "It would be unwise to relax any of these measures without the fullest consideration." The necessity for one trained Sanitary Inspector, at Kampala at least, is urged.

Haffkine's anti-plague vaccine inoculation was used in 13,458 cases. The danger of receiving from the infected area unginned and unpressed cotton, lest it contain plague infected rats, is represented. The use of rat-proof isolation huts is suggested at ports in the endemic area.

In regard to small-pox, the establishment of a "vaccine farm" is advised. The locally supplied lymph does not give satisfactory results at present.

The bucket removal system is gradually replacing the native "choo" —a cess-pool method. Destruction of excreta in small incinerators is practised *where fuel is cheap*; trenching is adopted elsewhere. But at Jinja the Medical Sanitary Officer advises that "all the night soil, except that collected at a considerable distance, be thrown into the Nile."

Malaria.

The Medical and Sanitary Officers responsible for this Report are fully alive to the necessity of affording the advantages of curative and preventive medicine to the population of the Protectorate. If development of trade and trade routes is hoped for, malaria, sleeping sickness, plague, and small-pox must be either got rid of, or rendered impotent to check commercial progress. Hence it is to be regretted that the difficulty in gathering statistics, which must be encountered in all countries recently opened up, impedes the possibilities of fully gauging the rate of advance. Thus, in the presence of anti-malarial measures, the only guide afforded is hospital statistics. These may be broadly true, but are open to the criticism that the extent of relief sought for is influenced by the local popularity of the consultant, or native belief in particular remedies. Had the stations where measures have been undertaken been inspected with regard to the malaria endemic index, or even splenic index, some criterion would have been afforded.

The report as to major sanitary works against malaria shows either a lack of appreciation of their commercial value by the local civil administration, or a lamentable lack of funds. Thus, whilst the good results of drainage of swamps at places mentioned above are officially recognized, and the systems are consequently maintained as permanent works, a halting policy has been adopted in respect to those at Nakivubo. Since 1910, at intervals, a total of £664 has been expended, with excellent results so far as the drying of adjacent land is concerned; but a portion of the swamp owned by Government would require a further £1,500 to reclaim it, and this is not forthcoming. It is apparently an instance of looking back after the hand has been put to the plough. It was within the power of someone in authority to ascertain what the reclamation would cost, and either have sanctioned it as a whole work, or have prevented an expenditure of nearly £700 on a portion and, therefore, on a comparatively futile effort

If it be held the first efforts were experimental, the feasibility of the work having been duly demonstrated, it should now be followed by further advance. In cleared ground, as a petty anti-malarial measure against affording shelter for mosquitoes, much faith is put in the planting of "French Grass" (*Cynodon dactylon*). It is reported to grow even on sandy soil.

Plague.

In the matter of plague, beyond the fact that inoculation has been favourably received by the natives, and that cases and contacts are segregated "when reported," it cannot be said that any definite information as to staff engaged, or of action taken, is forthcoming. The building of rat-proof huts in certain ports and the suggested danger of unginned cotton are subjects not yet administratively dealt with. The important question as to what radical action is feasible within the plague endemic area has not yet been apparently considered; and this the Medical Sanitary Officer points to as follows:—"The Regulations provided for plague prevention should not be relaxed, and should be exploited in the endemic areas hitherto untouched." Obviously, attacking the fire at its centre—not merely guarding its periphery—is what is required with the utmost promptitude. Side by side with the opening up of trade routes, and the increase of passengers and goods traffic, plague must shortly become of increasing sanitary importance; hence early and definite action would seem to be called for. The apparently small and scattered nature of the villages and the definite lines of trade routes have hitherto been favourable to slow spread. As Professor W. J. Simpson has recently been deputed to special duty in East Africa, his long experience will doubtless be fruitful of a complete scheme.

Sleeping Sickness.

The following extract from the Report by the officer in charge of sleeping sickness administrative measures (Mr. E. Haddon) gives a distinctly hopeful view of progress:—"Our efforts have already made an enormous difference, and fly, when found, were never numerous in places where formerly they swarmed. Many of the clearings are partially being kept up by the natives, and low-growing food-stuffs planted on the rich soil." The prospect not only of the clearings being utilized for cultivation, but, in the Nile area, of extirpating the fly by action within selected spots should appeal to the economist as well as to the sanitarian.

On the other hand, in a paper by Dr. H. Lyndhurst Duke,* after referring to the work of Kinghorn and Yorke, as showing that in Nyasaland the trypanosomes in local game are identical with the *T. rhodesiense* of man, he adduces reasons for holding that in a part of the Uganda Protectorate on the Victoria Lake, the trypanosome of game is indistinguishable from the *T. gambiense*. He, therefore, advocates game destruction as an essential for human increase, and states: "Given a number of fly and antelope in a district, there is nothing to prevent the infection with *T. gambiense* being kept up indefinitely." Possibly there is a way out of the difficulty, which the

*Duke (H. L.). Wild Game as a Reservoir for Human Trypanosomes. An Analysis of the Available Evidence from the Northern Shores of Lake Victoria Nyanza.—*British Med. Jl.*, 1914, Feb. 7, pp. 289–292.

term "indefinitely" used by Dr. DUKE naturally conjures up. It may be that to hold the country by cultivation of clearings, within a defined limit of which game could be kept severely under, whilst within the clearings and their immediate neighbourhood preventive action as to fly, man and beast could be taken, would prove a better fight than the present depopulation arrangement.

Conservancy.

Both the Principal Medical Officer and the Medical Sanitary Officer contend that the casting of the night soil of the town of Jinja into the Nile, as a routine method of disposal, is justifiable. The reasons relied upon are that, for thirty miles below this site, habitations have been removed, in connection with sleeping sickness measures, and that rapids exist. It is not suggested that below this there are not populations; whilst it is known that the visiting of the cleared area by the natives occurs—though forbidden. As the decision is deliberate, it has doubtless been arrived at after a careful consideration of physical and bacteriological data applicable locally. Dumping *en masse* daily night soil and urine of a population of 3,000 in a river is not quite analogous to such disposal of sewage after it has undergone bacterial change incident to slow progress through sewers. Presumably, however, destruction of the *B. typhosus* is not rapid locally, as the Report records "of the cases [typhoid] at Jinja, 7 were attributed to drinking contaminated water obtained from the vicinity of the pier of Jinja." In view of this statement, it would have been of utility to have described the position of the dumping spot (above or below the town) in relation to access to the river by the native residents within the township. But, putting such points aside as doubtless taken cognizance of locally, and granting that the procedure bacterially is safe, the ideal of night-soil disposal by dumping in a river is not one which should lightly be placed before a native community young in sanitary experience; especially one, as in this instance, so enlightened as to volunteer to pay for town conservancy.

Preserved Vaccine.

The total number of vaccinations, viz., 41,621 in a population of 2,840,000, is small, but the fact that anti-plague inoculation is accepted and even asked for would show that, under favourable conditions of sufficient and efficient staff supplied with animal vaccine from a central "farm," as advised by the Medical Sanitary Officer, rapid advance could be made. Meanwhile, experiments with varieties of preserved vaccine are in progress, viz., dried lymph, lanolinated lymph (both supplied by the Lister Institute), and Nairobi lymph (presumably glycerinized). No information is given as to date of manufacture, means of storage, or transport under tropical conditions. The order of success is reported to have been in the sequence just stated, but comparison of the figures at pages 12 and 24 of the Report shows that the mistake has been made of calculating the success rate whilst including the "unknown" in the total. If this be attended to, the lanolinated lymph is shown to have given the best results, not only as to success rate but as to absence of entries under column "modified results"; whilst the "dried lymph" takes the second place. This experience is in accord with the results, as to duration of activity of

vaccines, of recent experiments in their tropical colonies by the Germans, as recorded by VOIGT.*

Sanitary Administration.

A statement of financial circumstances of the Medical and Sanitary Departments, respectively, is supplied. The data given at page 6 of the Report refer to "estimated expenditure" for 1912–13; but, as this period is reported upon for the calendar year (1912), it is an open question how far money allotted under anti-malarial measures and sleeping sickness has been expended before the last quarter of the financial year, or has been allowed to lapse.

No better summary of the sanitary circumstances dealt with in this Protectorate can be made than in the following statement by the Principal Medical Officer:—

"If, however, sanitation is to be improved to meet the conditions brought about by the rapid increase in the buildings and in population, funds must be available to carry out or extend such schemes as are found necessary, concurrently with the development of townships, especially for conservancy, drainage, water-supply, hospital and prison accommodation; and staff must be available for effective sanitary supervision."

To the demand for money and a suitable trained staff may be added the plea that it is essential on the grounds of public health and financial economy that public bodies should, by timely legislation, and purchase where necessary, acquire control of land and water rights before private invested interests be asserted. It is therefore of poor augury that the large loan recently sanctioned by the Colonial Office for Uganda is stated to be solely on behalf of improvement of "communications"; no mention is made of public health necessities.

CEYLON.

†The Report under review embodies results obtained on recent inspection by Major JAMES, I.M.S., assisted by Dr. W. T. DE SILVA. The details furnished show that a careful inquiry into local conditions has been conducted, which must have necessitated great care and physical strain. That we do not concur with all his conclusions by no means alters our appreciation of the value of the data which Major James has laboriously collected, and on which his conclusions were founded.

Rural areas.

He opens his report as to Jaffna by reference to conservative Hinduism and the customs and prejudices of caste, in respect to their supposed inhibiting effect upon sanitary progress, but very rightly concludes, "highly important as they are undoubtedly, it is easy to make too much of them and to regard their recital as sufficient justification for lack of action with regard to sanitary needs."

*VOIGT (L.). Die Versorgung tropischer Schutzgebiete mit Kuhpockenimpfstoff. Erfahrung und Versuche.—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1911 Dec. Beiheft 10. pp. 497-521.

†JAMES (S. P.), M.D., D.P.H., assisted by W. T. De SILVA, I.M.S. Reports of Sanitary Inquiries in Jaffna and the Northern Ports and in Galle.—8 pp. f'cap. With map. 1914. Colombo: Printed by H. C. Cottle, Government Printer. [Ceylon Sessional Papers. IV. 1914. Price 25 cents.]

The physical characteristics of the area around Jaffna are such as to justify his separate consideration of a portion known as the Kalmanai spit, as contrasted with villages in closer proximity to Jaffna Both areas are but slightly elevated above the sea level, and possess a high level of subsoil water, which appears as springs on the margins of the sea-shore, in limestone rock with large crevices and, at times, "forming huge underground caverns containing a large storage of rain water" and yet, at intervals, many wells containing water, hard and brackish. But, in Kalmanai, the high level of subsoil water makes itself apparent by numerous fresh water springs, whilst there are also hillocks of sand "or sand dunes," where it is "scarcely necessary to do more than scoop away a few handfuls of sand in order to obtain fresh water." It follows that the villagers use largely wells for drinking water which are mere shallow excavations of sand. Irrigation of rice crops and fruit-bearing trees is largely conducted.

Under conditions such as are described, it is not to be wondered at, given the human malaria bearer and the mosquito proper to that end, that malaria should have become endemic, and that the addition of rainfall readily exaggerates the physical conditions tending to favourable pool formation. On the Kalmanai spit the splenic index was 70 per cent.; whereas, in the villages nearer Jaffna, this varied from *nil* to 3·3 per cent.; showing that in the latter villages malaria was in abeyance during the period of his inspection, namely, the dry season. In the case of the Kalmanai spit it was, however, noted that "the spleens of quite a large number of children and young adults were enlarged greatly beyond the umbilicus, the enlargement being accompanied by a serious condition of anaemia and debility, which was in marked contrast to the apparent healthiness of the children (including those whose spleens were found to be enlarged) in the neighbourhood of Jaffna." To ascertain the cause of this aggravated condition, Major James conducted a special enquiry. He considered that neither the physical conditions of Kalmanai, as affording facilities for mosquito propagation, nor the species of anopheles found (the *culicifacies* being largely distributed, and, in his opinion, being the chief local bearer) presented any difference in the two areas that would account for the extreme condition of the inhabitants of Kalmanai. He concludes they suffer from "residual infection" in systems lowered by "their mode of life," so that they remain infected throughout the non-malarial season. Elsewhere, it is stated that the people are "very poor, very primitive, very ignorant and (as a result of ill-health) very apathetic." It is disappointing to find that the only remedy that he found himself in a position to advise is that with which he has identified himself in India, namely, the confining of anti-malarial operations in rural areas to the distribution of quinine. In this case he recommends that this be chiefly accomplished by "travelling dispensaries."

Unfortunately the report gives no indication as to how the mode of life of this people differs from that of villagers nearer Jaffna, and the reader is left in doubt as to whether their poverty is not more due to lack of ability to labour than to the absence of available work; of which there must be a reasonable amount in the rich tract round Jaffna.

As already stated, Major James made his inspection during the dry season; and it seems to us, therefore, that he was hardly in a fair

position to correctly gauge the conditions of contrast of the two areas. Obviously, in both, the subsoil water level is such that the monsoon addition of rainfall readily saturates a soil already under the influence of capillary attraction, so that pool formation is an easy matter; but, whilst this is common to both, in Kalmanai the chances are that this influence would be much more pronounced, having regard to the additional factor of the water laden sand dunes, evident even during the dry season, and the frequency of excavations by scooping for water for drinking purposes in the sand. Under such circumstances, in the dry season, excavations are usually made only at spots where water is known to persist through a long period, but with a heightened subsoil water level during the rains such artificial pools are likely to be more numerous, because they are more readily obtainable within distances convenient to individuals. In short, we suggest that in Kalmanai, having regard to its physical characteristics, as described by Major James, the rainfall of the wet season would have a quicker and throughout the following dry season more lasting influence in the production of oozings of springs and persistence of pools than in the villages near Jaffna. Whether this theory be right or wrong, it seems undesirable that the villagers should be condemned to no effort beyond quinine prophylaxis, on evidence gathered solely during the dry season. The case would seem one where further study should be made in the two areas both in the wet and dry seasons, so as to determine the relation of splenic indices, subsoil water levels and rainfall. In his inspection, doubtless, Major James had not time to enquire into these and other factors, such as the prevalence of ankylostomiasis or kala azar—neither unlikely contingencies, as the people were largely Tamils. Whilst quinine prophylaxis would fill a useful sphere, it would have been more satisfactory, before he advised trusting solely to this remedy, to have made it clear why in this locality mosquito reduction by oiling, and the use of means to relieve, in some useful measure, surface and subsoil water, were impossible. At least covered shallow wells, or tube wells, might have replaced with advantage the shallow drinking water pits, which are ordinarily excellent mosquito breeding places.

Urban Areas.

In treating the town of Jaffna, the report deals more intimately with applied hygiene when, as an anti-malarial measure in certain cases, the complete working out of a surface drainage scheme and due attention to the capacity of road culverts are advised. In discussing a public water supply which the author urges as necessary, he shows that two schemes had some time back been drawn up, but neither could be executed for want of funds. He then suggests that the mode of assessment for purposes of taxation is inefficient, and brings forth ample proof that the people of Jaffna could well afford better contributions to public funds, and that means therefore should be taken to add to the finances of this Local Board. We suggest, however, that the quickest way out of the difficulty is to raise Jaffna to the rank of a municipality. Indeed, if the Government of Ceylon have not some strong and exceptional reason for maintaining a town with a population of 40,000 under rulings applicable to rural areas, it would seem an instance of mischance in official foresight that this was not long ago carried out.

As showing that, under the Act applicable in Ceylon, a municipality of approximately the same population, in a reasonable state of prosperity, should be able to pay for a water supply scheme, the town of Galle, which was next inspected by Major James, may be quoted. Here public waterworks were introduced in 1911. If it is not a sample of instances where there occurs an absence of that full threshing out of details of water schemes which we have advocated under our Note "To meet changing views," the condition of the water supplied is suggestive of invasion by odour producing organisms; for it is found that, at present, its smell and colour render it impossible even for bathing purposes, so that the inhabitants are using well water for which they pay by the potful.

Major James shows that in Galle and in Jaffna, in the matter of night soil and rubbish conservancy, both plant and staff are absolutely inadequate; and he urges the replacement of untrained sanitary inspectors, as now employed, by a staff of technically trained men, supervised by qualified medical officers of health.

Anti-Stegomyia Campaign.

The object with which Major James was deputed to Ceylon by the Government of India was understood to be chiefly to undertake a survey of *Stegomyia* prevalence, in reference to possible introduction of yellow fever. He however concludes his report by declining to recommend the expenditure of money upon an anti-stegomyia campaign, in towns possessed of so low a grade of sanitation as Jaffna and Galle. He apparently does not believe, for example, that the people of these towns can be protected from insect-borne diseases solely by subjecting them to elementary education. Instead of attempting, before applying public sanitary methods, to attain a standard of personal and domestic hygiene for rural areas as advocated by the Imperial Government of India, he conceives it necessary, in the first place, "to raise the general standard of sanitation in the town by making progress with the primary sanitary needs in connection with water supply, conservancy, drainage, and the organization of a trained sanitary staff provided with the necessary facilities and appliances for efficiently carrying out their highly important duties. By those means alone will the way be sufficiently prepared for the adoption of such specialized forms of sanitary effort as the reduction of mosquitoes."

British Guiana.

*This Colony has an area of 90,520 square miles and (excluding aborigines) a population of only 296,000. Its prosperity is at present chiefly dependent upon sugar cultivation, which is conducted in a mere strip of 70,000 acres of coast territory, whilst inland commercially highly valuable woods, and large areas suitable for cattle rearing remain unexploited. To develop these enormous resources, communications by rail and river navigation must be at the disposal of the capitalist. The problem he has to consider is that familiar in most newly opened tropical areas, of how best, in the presence of special diseases, to conserve labour, when handicapped by the

*British Guiana.—Report of the Surgeon-General for the year 1912-1913. [Acting Surgeon-General, E. D. Rowland.]—112 pp. f'cap. 1913: Georgetown, Demerara: The "Argosy" Company, Ltd.

necessity of trusting to importation ; the aborigines of the area in this case being unsuitable. The conditions must be that (*a*) reasonable health can be calculated upon by the immigrant, (*b*) that the importer be not taxed with unnecessary cost of voyages and contracts due to the supervening of preventable sickness and death, and that (*c*) local conditions be such as to induce the permanent settlement of families of labourers. So far reliance has been placed upon coolies obtained from India.

The Surgeon-General's report shows that indentured immigrants—presumably of labour-fit physique and age—died in 1910–11 at the rate of 18·2 per mille ; but, during the following years, this fell to 17·3 and 13·3 respectively. The last rate, whilst doubtless due to increased care in anti-malarial and general sanitary measures, must have been largely aided by the favourable influence of recent drought. These rates are found in a population of 66,000 on sugar estates, and under the increasingly favourable conditions of care exercised by owners. The prevalent diseases amongst this population are malarial fevers, ankylostomiasis and tuberculosis—all diseases which sap working powers, but are nevertheless capable of being defeated by sanitary measures. Such death rates, however, do not compare badly with those of the British Army in India within this generation. But when the population is removed from the sanitary environment of estates and settlement is attempted in villages, the evil influence of these diseases is accentuated ; the rates in a mixed population of various ages are swollen by an infantile mortality of 225 per mille of births, (five years average) a total death rate of 30·2, and a birth-rate of 31·2. The small increase of the total population, to the extent of 18,000 in the intercensal period 1891 and 1911, is accounted for not by natural increase but by indentured immigrants. Obviously, therefore, if expense of importing labour is to be avoided, the death-rate of these villages must be decreased.

In thus regarding this matter, the humanitarian view is much discounted by the fact that, heavy as the death-rate is in villages, it compares favourably with that of the country the East Indian labourers have left—the five years average for the Indian Empire up to 1912 being 34·85.

The Surgeon-General makes a special point, in pleading for sanitary reform, that typhoid fever is steadily making its way from Georgetown, where it has prevailed for some years, towards the villages, and that decided and early action is necessary if its spread over the country generally is to be prevented. He thus describes conditions in this important centre :—" Were it not for matter of sanitation effected by the breeze and sun, Georgetown would be as hideous as some of the cities of the Middle Ages when affected with plague."

In opening up the country by railways, and improvement of harbour accommodation, the importation of labour must be greatly increased. The immigrants must enter by the coast line of the country, where they will mingle with labourers already available, and with them make their way towards the interior. The result will be that the diseases which are now making attacks upon the sugar estates will assume their sway in camps and hastily built villages in the interior, under less readily dealt with circumstances than the present.

It seems, therefore, a reasonable method of approaching the problem of opening up this so-called "neglected colony," as a first step, to place its existing towns and villages in a sound sanitary condition. Sugar estates owners have, in most cases, already realized the necessity for war against the great labour disability diseases—malaria and ankylostomiasis—and the Surgeon-General's report shows that their effort have been largely successful. But, irrespective of finance, private efforts must have their limits. There must arrive a stage when these must be supplemented by public measures, if full success is to be reaped.

Here the question must arise as to whether it would pay this colony to undertake sanitary measures whole-heartedly by raising a loan. The present public indebtedness of British Guiana is small, and it has been able systematically to pay its debt by annual instalments. In the meantime, its Customs revenue shows yearly increases. A healthy coast-line would relieve the sugar estates (the present best support of the colony) of a heavy handicap in wasteful payment for labour, and leave the capitalist untrammelled to develop the excellent natural resources inland which undoubtedly exist. In such an endeavour the British Government would be well advised in aiding the colony by a special grant. There is reason to believe that in anti-malarial measures in this area, river training for commercial purposes, agriculture and drainage may be largely co-related; so that schemes in which private and public enterprise could co-operate with mutual advantage would be peculiarly applicable.

There is at present a tendency in the Colony to economise medical staff, which should be deprecated. With a population of 66,000 immigrants on the sugar estates, over 35,000 of whom were treated in the hospitals in 1913, the office of Medical Inspector has been abolished, and his duties are now required of the Surgeon-General, in addition to his existing work. No whole-time sanitary officer for the Province has yet been appointed, whilst in contrast with this serious blank in the staff there exist posts for *two* bacteriologists. These specialists, however, instead of being allowed to pursue their science uninterrupted, have had tacked on to them the duties of Health Officer of the port of Georgetown, and Government Medical Officer to the Local Government Board. Further, the Surgeon-General reports, "to enable medical officers to obtain leave of absence, private practitioners were temporarily employed during the year without any extra cost to the Colony." Would it not be more appropriate to maintain a sufficient reserve of officers to cover such calculable vacancies?

The Colonial Office Anti-Malarial Information Forms.

The Secretary of State for the Colonies, in December 1910, sanctioned the introduction of certain forms for incorporation with the Colonial Medical and Sanitary Reports. They were based on the recommendation of the Advisory Committee of the Tropical Diseases Research Fund, as suggested by Sir Ronald Ross. They are of an excellent practical character, and should serve the purpose of exhibiting lapses in local action. As adopted by certain of the reporting officers, however, they cover much stationery and demand much hunting for facts

by the inquisitive, as each area dealt with repeats the text of the items to be reported upon. It should be possible for Administrative Officers when compiling Reports for the Local Governments concerned to concentrate this diffuse matter in their offices, so as to appear in one or more easily consulted tabular forms. "Nil" statements would certainly not be missed.

DISEASE PREVENTION.

Malaria.

The Periphery of a Malaria Stricken Town.

It must be remembered that the spot maps in the case of Freetown, discussed in a preceding Note, illustrate conditions different not only as to period and grade of effort, but between those of the dry and wet seasons; and that we have argued therefrom that, granting that measures are being taken within Freetown of a spasmodic nature, invasion from the neglected surroundings is a probable factor in persistence of anopheles at the town periphery. Hence, it is a curious coincidence that at the All-India Sanitary Conference at Lucknow, in January, Dr. Bentley "drew attention to the fact that the centre of even malarious towns was usually comparatively free of malaria." As reported by the (Calcutta) *Statesman*, he argued therefrom that "by taking steps to concentrate the scattered population of villages and hamlets, it might be possible to bring about a reduction of malaria as well as simplify other sanitary improvements." In the discussion which ensued, Captain Gill said it did not always follow that the centre of a town was more congested than its peripheral portion; in certain areas congestion during the day might disappear at night; in Amritsar the centre of the town contained generally well-to-do people, and this was a factor in reducing malaria. Major Christophers thought that the existence of lofty buildings in the centre of Amritsar was another factor in modifying the intensity of malaria. Major Perry quoted an instance of a small town in which the spleen rate was taken in 1896. Since then the population has been halved, owing chiefly to the ravages of plague. This diminution of the population had however no appreciable diminution on the spleen rate. Captain Stiles Webb referred to Palwal, where mosquitoes were much more plentiful in the periphery of the town than in the centre. Recently there had been a rapid fall in the spleen and parasite rate of that town, and he believes that this result could be paralleled in many other places in the Punjab.

It would be hopeless to generalize on such a subject; and, certainly, it would require much more evidence than given in these references to justify a policy of malaria prevention by concentration of populations, as advised by Dr. Bentley. For example, whilst clean wells may often be just as good an inducement for mosquito propagation at the centre of a town as at the periphery, the chances of securing puddles free of sewage contamination would be less the thicker the population; and whilst it is quite possible tall buildings in the centre of the town and successive lines of buildings generally may be a factor in staying invasion, the spot map of Freetown, illustrating conditions as found by Sir Ronald Ross in the wet season, shows that then the central areas had no immunity from anophelines.

Cholera.

Organization against Cholera in the Madras Presidency.

In the Madras Presidency, all the Local Bodies—Municipalities more especially—have long enjoyed self-government of a very liberal type. Consequently, when a specific sanitary scheme is placed before them with the approval of the Government, their consent to its adoption

individually, or their desire for modifications, is duly considered. Since 1895 the Madras Government has secured adhesion from time to time of the principal, and latterly of the smaller, municipalities to Rules for prevention of cholera, which have the advantage of the force of law by being framed under the District Municipalities Act, which these Bodies administer. In the last quarter of 1913 (Madras Government Order No. 1,969M of 13th October) the Municipalities of Berhampore, Chicacole and Parlakemedi in the Ganjam District have formally accepted the Rules. As the organization required by these Rules has stood the test of experience during 17 years, and has been accepted by the self-governing Bodies with caution (dictated not by objections to the sanitary measures but to the necessary financial clauses supporting them), some account of it may be useful.

The first two Rules define the nature of cholera and its mode of spread; the third states "it is the object of these Rules to ensure (1) that all the earliest possible information of every attack of cholera should be conveyed to the authorities, so that the cholera microbes may be at once prevented from being conveyed into situations in which they might spread the infection; (2) that the microbes should be at once completely destroyed; (3) that Medical assistance might be provided for those who, in spite of precaution, might be attacked by the disease. They accordingly follow these three divisions." These are stated to be (1) Observation; (2) Prevention of infection; (3) Medical aid.

Rule 4 renders Municipal Councils responsible for the general carrying out of the scheme, but the District Medical and Sanitary Officers (chief Civil Surgeons of Districts) are responsible for professional arrangements, both within Municipal limits and external to them. Each Municipality is divided into areas called "Circles," which are not to include, respectively, less than 1,200 or more than 1,500 houses, or 7,500 inhabitants. Three such circles form a Division. It is directed that the Head-Quarters of the Divisions shall be selected and marked on the map of the town concerned. The map thus divided is required to be approved by the chief civil officer of the district, and is then recorded in the municipal office, whilst a copy is supplied to the local senior medical officer of the municipality. For use within each division, a definite amount of disinfectants (whose nature is stated) and apparatus are required to be "always maintained" and "kept in good condition" by the Municipal Chairman. The following very useful financial provision is worthy of being quoted verbatim; as in its absence, on an epidemic occurring, a Municipal authority must resort to the cutting down of some other sanctioned items in their Budget—the chances being certainly that some permanent sanitary improvement would be deferred:—

"In order to make provision for meeting the charges under the portions of this scheme relating to observation and prevention, the Council of every municipality to which the scheme applies shall be required to allot in every budget, under "cholera charges," a sum which shall be in the proportion of Rs. 1,000 to every 25,000 inhabitants in the Municipality. This shall be called the "cholera reserve," and shall not be spent upon any object but the carrying of this scheme into execution.

The position of this Reserve should be not allowed to disturb the existing percentages to the total municipal income of the expenditure

upon the communications, education, sanitation, etc., or to swell the totals of the allotment made for sanitary purposes, under grants 1, 2, 3, and 4, taken together, but should be set aside from funds which are at present annually expended upon sanitary works of a permanent nature."

The organization and duties required of the staff differ according as the period is one of "observation" or "prevention." Under the first head, the prime object is that the Chairman shall be notified of the approach of cholera. That it may be understood how this warning as to cholera "imminently threatening" a municipality is obtained, it is necessary to state that in the Madras Presidency, although sanitary staff organization in rural areas is certainly, as in the case of municipalities, far in advance of other parts of India, in the majority of Districts it is still necessary to rely largely upon officials of the Civil Administration for the gaining of intelligence of first cases of epidemic diseases, outside the limits of municipalities.

The Chairman may receive warning from the chief Officer of the District, or from any other subordinate Revenue or village officer. Warning also may be sent to him by the Sanitary Commissioner or his Deputy, or by a District Medical and Sanitary Officer. In these cases, by a Government executive Order, a Chairman is bound to call a meeting of the Council within three days if the official letter be marked "epidemic urgent"—whether the epidemic be cholera or other disease. The Chairman is therefore not liable to err from lack of a "Remembrancer." The civil officials secure prompt information by a ruling which is rigorously enforced by them that each Village Head must report cholera, small-pox, or "other unusual disease" *by the most expeditious method* to his immediate superior officer, and to the Heads of the neighbouring villages. Any instance of neglect of this useful order is always promptly represented by the officers of the Sanitary Department. This method of warning is strengthened by requiring the District Medical and Sanitary Officers of the adjoining districts to communicate with each other daily the movements of cholera—telegrams being used when necessary. The immediate superior officer of a Village Head (Tahsildar), receiving information as to cholera in areas devoid of a sanitary staff, informs the nearest Sub-Assistant Surgeon in medical charge of a dispensary, which institutions are usually at distances from each other not exceeding ten miles. As an urgent matter, this man closes his dispensary (out-patient institution) and at once proceeds to the village concerned, takes the first preventive measures, offers treatment, and *awaits relief* by the District Medical and Sanitary Officer sending special sanitary and medical subordinates.

Having by one or other of the agencies mentioned received warning, the Chairman's duty is at once to mobilize the "observation staff." In every circle, as above defined, to the existing normal sanitary inspecting staff he is required to add a Sanitary Inspector aided by a peon (orderly) and a special scavenger. For every three circles, a special Sanitary Inspector is appointed as Divisional Inspector, and is provided with a better class orderly. Both are mounted or use bicycles. The Divisional Inspector patrols his circles searching for information, seeing that his inspectors do not shirk work, watching graveyards, and water-supplies, etc. He is responsible that

intelligence from his division is rapidly conveyed to his superior sanitary officer in charge of the whole operations of the town, and that orders received from that officer are quickly communicated to his subordinates. Doubtless in the present day telephoning will largely supplement the work of these mounted orderlies. The following duties are required of the observation staff :—

"It will be the duty of the members of the observation staff to constantly and systematically patrol the whole of their circles, in order to gain intelligence of the first case of cholera or of the first case of diarrhœa in it, so that immediate action may be taken. At such times cases of severe diarrhœa should be regarded as equally dangerous as cholera. The members of the observation staff should also be employed in removing, with the aid of the ordinary conservancy establishment, all defects in sanitation which would favour the multiplication of the cholera microbe. . . . and should report their action to the Chairman." [Under the influence of this staff, a general effort at cleansing of houses and premises follows, which may, in the presence of pronounced apathy by the inhabitants, be aided by an urgent Magisterial Order.]

. . . . "They should further warn the inhabitants of the circle to adopt precautions against cholera described in the extract from Surgeon Lieut.-Col. ———— "Simple Sanitary Rules" which is printed as an Appendix in these Rules, and should distribute copies of this, which the Chairman will keep ready printed in the vernacular, gratis and as widely as possible."

Period of Prevention.—On receipt of information of a first attack of cholera in the town, the Chairman is directed to "at once employ in the circle in which it has occurred (and not in other circles) three peons (orderlies) and three scavengers—as additions to the existing observation staff. The preventive staff "shall visit every house in which cholera has occurred, and shall use the greatest care in seeing that all choleraic vomit and excreta are at once collected in separate vessels mixed with carbolic saw-dust (1 part of carbolic acid to 10 parts of saw-dust), paddy husk or other combustible matter, and where necessary with kerosine oil, and thoroughly, completely and immediately burn on or near the premises. . . . The Chairman shall delegate to the senior medical officer of the town and to such others as may have to act under this Rule, his power of entering and inspecting houses.

"Rags, clothing and bedding stained with vomit or excreta should be similarly burnt upon the spot, under the same precautions, the danger of keeping such articles being fully explained to the owners and full compensation in money or kind being offered in the case of the really poor, or where the owners or other persons concerned so desire, the clothes and bedding may be boiled in disinfectants and returned to them."

Whilst patients are informed that medical aid and, for the poor, medical comforts are available gratis, the sanitary staff make it clear to householders that their liberty of action in the treatment of the patient will in no way be interfered with; as a result, the representative of curative medicine in charge of the case is often the indigenous *hakeem* or *vydeen*, whilst East meets West in the person of a well-educated Certificated Sanitary Inspector, in charge of the public interests of applied hygiene. The receptacles containing carbolic saw-dust for vomit and excreta are supplied gratis to all, the necessity for careful collection being impressed; the contents are dealt with by members of the staff calling at individual houses at regular and short intervals. Special receipts are given for clothing

and articles to be disinfected, as suspicion as to disposal of these leads to cases being concealed. These apparently trivial details as to medical treatment and disposal of clothing are of primary importance in working this whole system. Once the inhabitants are convinced that in these matters their private liberty is not interfered with, our experience has been that they willingly bring cases to notice for sanitary care.

Medical Relief.—As to Medical aid, it is ruled "there shall be a head-quarters in each division (shown on the map made under the Rules) at which a medical subordinate shall reside, who shall be supplied with medicine and medical comforts from the municipal hospital for the treatment of those attacked, and who shall be available for attendance gratis on the sick in their own houses. This shall also be the head-quarters of the Divisional Inspector and of the preventive staff on night duty."

In one part of the town at least, it is required that an isolation hospital with separate accommodation for male and females of voluntary patients be provided, and furnished with necessary staff and equipment.*

Thus it will be seen that, in all matters, the staff engaged on curative duties is kept distinct from that employed on preventive measures.

These rules, originally promulgated in 1895, recognized the convalescent cholera patient as a "carrier," although to a more limited extent than the recent useful investigation by Major E. D. W. Greig, I.M.S. on this subject now warrants. In a note appended to the rules, it is stated "it is most desirable that the excreta of a patient for at least ten days after he has recovered from an attack should be carefully collected and disinfected and carried away. These still contain cholera microbes." A special type of air-tight iron excreta drums is then prescribed. In the extract from the "Simple Sanitary Rules," utilised for hand-bill distribution, as well as in the preamble of the official rules, the danger which has of late been under increased observation of allowing flies to settle upon food, and the use of cold cooked food is duly adverted to. It need hardly be added that they contain the usually recognized precautions of using none but boiled water for drinking and domestic use, the boiling of milk, eschewing unboiled vegetables, etc.

As to results secured by this system, it was found three years after its adoption that in twenty-four towns, having an aggregate population of 987,835, accepting the rules the average cholera mortality was ·97 per mille less than in those who had not utilized it, viz., 21 towns with an aggregate population of 428,914. This may be regarded as a small life-saving result (2,874 lives in three years), but as the population

*Under the Madras District Municipalities Act, when a Hospital is provided, the Chairman on a medical certificate may direct the removal of any person "suffering from a dangerous and infectious disease, who is, in the opinion of such medical practitioner, without proper lodging or accommodation, or who is lodged in a room occupied by more than one family."

dealt with is large, this fraction, if a continuous factor, represents no inconsiderable gain; it being understood that the difference of procedure in the two groups of towns consisted not in having in one of them no organization whatsoever, but simply that, in the 24 towns, *the preliminary observation* and details of organization which the rules enforce were promptly acted upon.

A District with and without an Organization against Cholera.—A remote as to time, but none the less decided, illustration of the benefit of organization against cholera is on record, in respect to the district of Kurnool, in the Madras Presidency. The District and Medical and Sanitary Officer (W. G. King), during the period 1884–'89, arranged, in the presence of cholera advancing in the neighbouring districts, to meet it by specially training lay Sanitary Inspectors for the work, on the system of circle observation and prevention adopted in later years in the above rules, within the headquarter municipal town, aided by circle inspectors in charge of rural areas. He had the great advantage of being supported heartily by successive chief Civil Officers of the District, with the result that Village Heads were not only prompt in reporting cases, but in seeing that in areas "imminently threatened" petty general sanitary measures required of them were systematically carried out. Prompt reporting was much facilitated by the free use of the telegraph of a private Irrigation Canal Company, whose charge radiated through important parts of the District. At the suggestion of the District Medical and Sanitary Officer, Government sanctioned that a direct system of intercommunication between neighbouring districts showing advance of infection should be established. The following was the result as compared with the surrounding Districts, where other methods were in use :—

Statement showing the Cholera death-rate in Kurnool and its bordering Districts for six years ending 1889.

District.	Death-rate in.					
	1884.	1885.	1886.	1887.	1888.	1889.
Kurnool	0·02	0·3	—	0·2	0·6	0·4
Bellary ..	0·9	0·5	—	1·8	1·8	1·9
Anautapur ..	0.5	0·3	0·03	2·9	2·0	0·4
Cuddapah	0·4	0·8	0·2	1·0	1·2	1·3
Nellore	1·0	3·1	1·8	1·5	2·2	2·4
Kistua						

In 1890 the officers concerned were no longer in the district and, apparently, less sanitary discipline subsequently was maintained, as, by 1892, this area was the most severely affected in the Presidency. It lost 4,866 of its population, or 6 per mille. No less than 289, or 36 per cent. of its villages were infected, against 17·5 the average of the Presidency :—

Statement showing the Cholera death-rate in Kurnool and its bordering Districts for 3 years ending 1892.

	Death-rate in.		
	1890.	1891.	1892.
Kurnool	0·1	4·8	6·0
Bellary ..)	0·03	4·8	(2·7
Anautapur ..)			) 1·2
Cuddapah	1·80	5·5	2·6
Nellore	0·03	1·4	1·2
Kistna	0·006	2·8	2·4

An Extract from the District Medical and Sanitary Officer's Report (*Annual Administrative Report of the Sanitary Commissioner for Madras*, 1887) thus describes results :—

" Ample warning of the approach of the disease was given to all District Officers by means of the new system of intercommunication between Districts, and every effort was made by inspection on an organised plan . . . to ensure that villages were properly prepared for the campaign, and, secondly, that instant reports as to the occurrence of cholera should be secured.

" In only one village did this system break down, as the result of apathy or disobedience on the part of the Village Head. In this village the Report of the existence of cholera was delayed, and time had been given for the wide sowing of the cholera germ. Here 41 deaths occurred. Yet though the disease was introduced into village after village, in no other case did it appear to get beyond reasonable chances of control. . . . As far as my experience during the several epidemics that have occurred during my service goes, I am of opinion that the spread of epidemic cholera is in inverse proportion to the amount of care that has been bestowed upon sanitary measures."

Organization against Cholera in Bengal.

In the *Indian Journal of Medical Research*, 1913, October, Vol. 1, No. 2, Dr. T. H. Bishop, the Chief Medical Officer attached to the Lower Ganges Bridge Construction Works, describes an organization by which he attempted to prevent the labour being victimized by cholera.* He placed both banks of the Ganges under observation; one area, Nadia, measured roughly 55 square miles, the other, Pubna, 33 square miles. The staffs consisted of one Assistant-Surgeon in charge and three Sub-Assistant-Surgeons, each in subordinate charge of a sub-division. The areas embraced numerous villages, with an aggregate population of 37,337. The staff undertook general sanitation, inspection and enquiry as to infectious diseases, with special reference to cholera. They made a point of teaching households the prime facts of cholera prevention. Birth and death registration also occupied their attention, so that Dr. Bishop is able to give a table exhibiting birth and death rates for two successive years showing that whilst in 1910, in the Pubna area, there were 693 attacks, in 1911 they declined to 503, and to 103 in 1912; whilst eight only were recorded in the first six months of 1913. In the Nadia area, in 1910, there were 489 cases, in 1911, 332, in 1912, 103, and 16 in the first six months of 1913.

*The working of the Cholera Prevention Scheme on the Lower Ganges Bridge Construction.—*Indian Jl. Med. Research.* 1913. Vol. 1. pp. 294-309.

He thus describes the condition of villages in the Nadia area:—"Most of the villages are situated in dense undergrowths with pools of stagnant water here and there. These conditions are aggravated in the rainy season, and malarial fever abounds. The roads and the villages at this time of the year are a mass of slush, and such open spaces as may exist without jungle are littered with human excreta." A rural area of this character is certainly one ripe for sanitary reform.

Under the advice of Dr. Bishop's staff village water supplies were mproved, food supplies were inspected, and preventive action against small-pox and chicken-pox was undertaken, as well as anti-malarial measures and quinine prophylaxis.

The Government of India whilst approving of executive sanitary staffs in municipal areas has not encouraged their extension in rural areas—they being of opinion that the spread of Elementary Education will, in course of time, secure an automatic demand from the large population involved. That is a matter of policy which is beyond our scope to discuss, but it is noteworthy that Dr. Bishop's scheme though nominally on account of cholera was analogous to complete efforts by a rural sanitary staff; although he elects that its success be judged by the test of decrease of that special disease. The conditions which may determine epidemic years being put aside, there can be no doubt that he has been able to give a useful and practical illustration of the life-saving influence of sanitary staffs in rural areas. His improvements of water supplies more especially must prove of permanent value. In this direction, tube wells were freely used.

Either by choice or as the result of no trained sanitary inspectors being available as yet in Bengal—although this will shortly cease to be the case so far as urban areas are concerned—the staff employed was medical. Irrespective of the fact that a staff which has not specialized for sanitary work is not the most suitable instrument for disease prevention—although medical knowledge makes an excellent foundation for their training—there can be no doubt whatsoever that men detailed for sanitary duty should not also undertake medical treatment of cases. To permit this is at once to put an end to sanitary surveillance in the interests of a community, to benefit an individual. The condition would correspond to a fire brigade concentrating attention on a single room, whilst a fire is spreading to the neighbouring streets. This conviction was probably also to some extent forced upon Dr. Bishop; as he insisted upon his staff confining their treatment to cholera cases.

Dr. Bishop does not state whether or not the men employed by him were mounted. This is essential in the case of rural sanitary staffs, not only on account of increased efficiency of surveillance of the community but of economy in men and their pay. For example, in this scheme, a strictly sanitary staff might have been well smaller and consequently less expensive in relation to the area supervised.

Measures for Dealing with Cholera in the United Provinces.

According to a paper read by Captain DUNN, I.M.S., at the Madras All-India Sanitary Conference of 1912, the reporting of outbreaks of cholera in the United Provinces is expected of the civil officers but,

as the watchman of the village concerned is depended upon in the first place, intelligence is much delayed. This menial, it is suggested, is apt to wait until he renders "his usual fortnightly or weekly mortality Reports." The police station officer receiving these sends them in weekly to head-quarters, where they reach the District Magistrate. "The latter informs the Civil Surgeon, at whose disposal the only agency is that of vaccinators." Captain Dunn says:—"To cut a long story short, my experience is that no agency to disinfect wells is established as a rule until three weeks or a month have elapsed since the outbreak actually occurred, and by that time as a rule the disease s spread over a considerable area and the vaccinators are quite unable to cope with it."

In this Province, obviously, no attempt is made towards the supply of a sanitary staff; as vaccinators neither by education nor status can be so regarded. In the absence of a staff, Captain Dunn advised the use of Revenue subordinates, with the object of their treating wells with permanganate of potash and eradicating possible breeding grounds for flies. Under his system, which he suggests should hereafter be pursued, he claims to have obtained much success, and gives the instance of one District where the average deaths per day for ten days in April were 65·5, and in three successive weeks, in May, 95·1, 22·8 and 13·3. He would arrange to secure early reports of cholera cases by urgent messages, such as are employed to report dacoities.

The efforts of the author were suitable as a make-shift in the absence of a sanitary staff; and by tolerance of the civil administration of subordinate civil officers having their normal duties hampered by work not their own, it may well be that the course of the epidemic he treated was affected by his measures. It must however be remembered that it is not infrequent for cholera epidemics which are allowed to run their natural course to die out in three weeks in localities invaded.

The condition of affairs brought to notice by Captain Dunn points to the necessity for the presence of an executive sanitary staff in the rural areas of the United Provinces; but, as it was recently proposed to spend within the next five years £233,000 on Elementary Education in this area, presumably some other reason than "want of funds" dictates a preference for the use of vaccinators in cholera epidemics.

The author undertook experiments on the action of permanganate of potash, and found that $\frac{1}{8}$th grain per gallon of contaminated water was necessary to secure death of the cholera vibrio in one hour. He thinks that instruction to use 1 oz. per average well (2,000 gallons) will suffice. This is a commonly used rough estimate. Experience elsewhere, however, shows that it is a simple matter to follow a more exact method by supplying subordinates disinfecting wells with a table of quantities, based on the measurements of round and square wells respectively.

Measures for Dealing with Cholera in the Bombay Presidency.

Major H. A. F. Knapton, I.M.S., in a paper read before the All-India Sanitary Conference in 1912, at Madras, lays stress on the action of the house-fly as a disseminator of cholera. He states:—"In the Central Division of the Bombay Presidency when a case is reported

to have occurred at a village, a list of questions is sent there [presumably to the Village Head, as no rural sanitary staff exists] to find out the conditions under which it appeared, together with a pamphlet in vernacular, entitled "Simple Instructions to prevent the spread of Cholera." . . . If the advice given in the pamphlet is efficiently carried out, experience shows that the disease disappears almost immediately. . . . But the difficulty is to get people to follow the methods advocated."

Pamphlets sent to villages already in the throes of cholera doubtless have their use; but whether these can safely take the place of public sanitary measures for the suppression of epidemics may be doubted. They are probably as useful as "mantras" (spells or incantations).

The Bombay Presidency annual statistical returns for 1911–12 show that 31,549 died of diarrhoea and dysentery, against 5,817 of cholera. But there is probably here some "terminological inexactitude" in diagnosis by the Village Heads, as the vital statistics of that Presidency have exhibited during several years a suspicious tendency to very heavy returns under the head of "diarrhoea and dysentery," which may well be connected in part with unchecked cholera. The figures fluctuate more markedly with the presence of cholera than even in the Central Provinces, which is its only rival in this respect. If this be not the correct interpretation, the subject of "diarrhoea and dysentery" in these two areas of the peninsula of India deserve more attention than hitherto given.

Typhoid Fever.

Anti-Typhoid Inoculation in three Armies serving in the Tropics.

*The Americans, having convinced themselves of the utility of anti-typhoid inoculation, have not been slow in coming to the common-sense conclusion that their army should reap its benefits fully. Inoculation was rendered compulsory in the U. S. Army in 1911. In that year, there were 24 cases with 5 deaths with an admission rate of ·26 per mille, against 5·62 for a period so recent as 1904. According to the Report of the Surgeon-General, United States Army, for 1912, not a single case of typhoid occurred amongst the men stationed in the United States, Hawaii, Porto Rico, or Philippine Islands, during the first six months of 1913. Having regard to the still unsettled period of immunity, following anti-typhoid inoculation, men re-enlisting are re-immunised. The success following compulsion has thus far fully justified action: and it would seem but the logical outcome that the Surgeon-General's advice to the American Government be accepted, namely, that when mobilization of the Militia or the Volunteers for field service is demanded, compulsory inoculation should be promptly adopted.

†At present, the British authorities are content to let the acceptance of the prophylactic be optional. Nevertheless, our soldiers in India are not slow in showing appreciation of the aid in resisting typhoid which

*Report of the Surgeon-General U.S. Army to the Secretary of War. 1913. Annual Reports War Dept., fiscal year ended June 30, 1913.—303 pp. 1913: Washington: Govt. Printing Office.

†Report on the Health of the Army for the Year 1912. Vol. 54. With tables.—1914. London: H.M. Stationers Office.

WRIGHT'S method has placed at their disposal; as by 1912, 90 per cent of the troops there had accepted it. In that year, the admission rate for typhoid among the inoculated per mille was 1·20 and the death rate was ·15. In 1910, a differentiation between typhoid and paratyphoid was made; so that, if these are grouped together, the admission rate would be 2·6 and the death rate ·39; contrasting forcibly with the respective rates of 6·69 and 2·69 amongst the non-inoculated.

In India, the question of fading grade of immunization is met by re-inoculation within thirty months, which is well accepted by the men. Irrespective of routine methods against spread of typhoid, the arrangement of using special depôts on the hills for observation of "carriers" till safe, must be of advantage.

The results secured in the British Army in India in 1912 form a contrast to the growing intensity of typhoid incidence in the "seventies." In the three decades following 1877, the death-rate from typhoid was respectively, 3·21, 6·29, 4·88 per mille. From 1904 improvement, which has culminated in the figures quoted, has been continuous.

*In the colonial army of France, in an effective strength of 186,034, the admission rate for typhoid between 1903–10 was 7·3 per mille, with a death-rate of 1·91 per cent of those under treatment for the disease.

In June 1911, on the advice of Professor LANDOUZY, typhoid immunisation on the method of Professor VINCENT was approved by "la commission supérieure consultative d'hygiène et d'epidémiologie militaires." That expert uses a polyvalent inoculation, on the ground that it is particularly suited to meet the various pathogenic organisms met with in the French Colonies. By the end of 1912, 930 inoculations had been performed; but it is reported that, owing to the considerable re-action with which this particular form of inoculation is attended, it has not been readily accepted by the soldiers; so that progress under the voluntary system has been slow. Owing to the scattering of the inoculated men, it is not possible as yet to say how far results have been favourable.

KALA AZAR.

Kala Azar in Assam.

†Lieutenant-Colonel Leonard ROGERS and Dr. J. Dodds PRICE, in their paper published in the *British Medical Journal* of the 7th February 1914, give the results of observations in Assam Tea Estates on the prevention of kala azar. Price, in 1895, after long practical experience, formed the opinion that the disease was a "house disease." In 1896, Rogers came independently to the same conclusion. Price put his belief into practice, by securing new houses for a batch of 150 newly arrived healthy coolies. These houses were situated within 300 yards of the lines containing the old inhabitants, who were severely affected by the disease. Within these old lines 50 of another new batch were accommodated. On the lapse of two years 16 per cent. of the latter contracted kala azar, but the 150 in the new houses remained healthy.

* LAFAGE & ABBATUCCI. Les Vaccinations Antityphiques dans le Corps d'Armée Colonial. *Ann. d'Hygiène et Méd. Coloniales*, 1913. Apr.–May.–June. Vol. 16. No. 2. pp. 479-485.

† PRICE (J. Dodds) & ROGERS (L.). The Uniform Success of Segregation Measures in eradicating Kala Azar from Assam Tea Gardens.—*Brit. Med. Jl.* 1914. Feb. 7. pp. 285-289.

Rogers then suggested selecting the healthy from amongst the number resident in the old infected lines, so as to place them with the 150 in the new quarters. In evidence of the intensity of infection in the old lines, the authors state that of 96 persons selected as healthy five had subsequently to be removed, as they showed symptoms of the disease. In the new lines, at the same period, 800 freshly imported persons free of the disease were added to the total inhabitants. At the end of 16 years, these lines remained "absolutely free of kala azar," whilst the coolies who were retained in the old lines died off. But it was noted that in this period, "kala azar spread to a 'contiguous line' inhabited by 60 healthy coolies who had worked for years on the estates."

They emphasize these results by nine similar instances, and finally state :—

"It thus appears that in the ten lines . . . . kala azar has been stamped out of a labour force of nearly 7,000 workers, after it had caused a mortality within a few years of 207 per mille. . . . . As it costs from £7 to £14 to recruit a coolie, and the average duration of the illness is at least seven months, during which food and treatment cost £4, it is clear that, in addition to the great saving of life and suffering, the financial aspect of the case to the tea industry is of great importance."

The authors consider that, as malaria was not checked by their procedure, mosquitoes or other flying insects may be excluded as causative agents; and that water can also be put aside, as the same source was used by both old infected and new non-infected lines. After showing that disinfection, directed especially against the bed bug, proved of advantage for five years subsequently in certain infected houses, they are disposed to adopt the bug theory of transmission, as supported by Captain PATTON'S well known work on the subject.

In the above Report where, whatever theory be held as to transmission, the plain fact stands out that in new houses in close proximity to the old, no spread of kala azar occurred, it is to be regretted that further sanitary details were not furnished. For example, Lieutenant-Colonel DONOVAN, in the Madras All-India Sanitary Conference of 1912, whilst recounting the *pros* and *cons* of insect transmission laid special emphasis on the condition of the intestine of the sick. Of the importance of intestinal symptoms towards the fatal termination of cases, there can be no doubt whatever; and in the old days, when kala azar was not differentiated, this formed one of the symptoms which appealed to us in contrast with malaria. Hence, in such an enquiry, it would have been well to show clearly whether in collection of rubbish and night soil, there was any difference as to type of apparatus and time, between the conservancy of the old and of the new lines. Again, it is but reasonable that some explanation should be given of why transmission occurred from the old infected to a "contiguous" healthy line—especially as the distance is not stated. In regard to water supply, the evidence is not sufficient to put it fully aside; unless it be shown that the new and old coolies used not only the same water for drinking purposes but also the same bathing and clothes washing places. Lastly, it was of the greatest importance that something should have been said as to the extent to which inter-communication occurred between the infected and non-infected coolies. In a free population of this class, unless a caste difficulty was paramount, it would

not be feasible to secure that they did not occasionally spend much time in each other's houses at night and during various ceremonies and feasts, such as are common in Indian populations.

The authors made experiments as to the getting rid of bugs in huts with mud walls by burning the thatch roofs, but this failed to kill insects within the cracks. Similarly, sulphur fumigation did not meet fully requirements. We suggest that the killing of bugs could best be accomplished by flaming with powerful kerosine brazing lamps.*

Yellow Fever.

The warning by the Principal Medical Officer as to possible existence of yellow fever in Sierra Leone will doubtless not be forgotten by the Colonial Office, in connection with the recent appearance of the disease in Lagos and the not remote epidemic in Freetown of 1910. It would also seem that the nature of "vomiting sickness" of Jamaica is worthy of further enquiry. Indeed, the facts for and against endemic cases in territories under British rule should certainly be marshalled before the sitting of the International Commission on yellow fever, which is reported at present to be under discussion by the Powers; and consequently the special officer pleaded for by the Principal Medical Officer should be supplied quickly. It will be remembered that at the International Medical Congress in London, a proposal was made by Dr. J. J. Van Loghem, Director of the Institute of Tropical Hygiene, Amsterdam, that such a Commission should be advised. This was negatived by a majority of votes—the feeling being apparently that it would be a bad compliment to pay American energy at Panama; the well-merited hero-worship of Surgeon-General Gorgas by tropical sanitarians of all nations being probably at the root of this decision. But, there is at least one port outside the American jurisdiction—Guayaquil—which has been a cause of intermittent alarm to the Panama authorities for a long period both as to yellow fever and plague, and there are other ports in South America where enforcement of special sanitary measures would be of advantage. The *United States Service Public Health Reports* (1912, Dec. 13, p. 2074) refer to the fact that attention need not be turned solely to the Ports of Ecuador and, after referring to Manaos in Brazil, state:—

"In this connection, it is to be borne in mind that the reported cases of yellow fever in that part of South America north of the Amazon River give at least a poor idea of the prevalence of the disease in that region. Yellow fever is, and has been for some time endemic at Iquitos, a city of Peru on the Amazon River. It has also become endemic in many localities throughout South America, north of the Amazon. There are those who believe that the disease unrecognized is also endemic in certain localities in Central America and, possibly, even as far north as Southern Mexico, and, from time to time, reports are seen in print to the effect that yellow fever still persists in endemic form in certain of the islands in the West Indies."

The Ecuador Government, after energetic representations by America, has now voted £2,000,000 for the sanitary improvement of Guayaquil.

*See King (W. G.) "Flaming" in Prevention of Plague and Kala Azar. [Correspondence.]—*Indian Med. Gazette*, 1913. March. Vol. 48. No. 3. p. 124.

Although arrangements will be in the hands of a British firm, it is rumoured that the unique experience of Surgeon-General GORGAS will be available.

The present request for a Commission was advanced by the Netherlands Government, and has already been approved by the Government of America. As showing that no American susceptibility exists on the subject, it may be remembered that a similar suggestion was made by Surgeon-General GORGAS, in a paper read before the Fourth Pan-American Scientific Congress in December 1908, when he stated :—

"Concentrated effort on the part of the countries in which it now occurs, I think, would extinguish the disease at once, at no very great expense and without undue labour. I believe that if this Congress could get the Governments of the various countries in which yellow fever has occurred during the past year to agree to keep such an organization as I have outlined, which could be sent at once to the locality where yellow fever appears and there stamp it out, at the end of two years yellow fever would have disappeared from the Western Hemisphere."

Except *via* the Canaries and the West Indies, the future connection between the West Coast and the Panama Canal must be slight. Presumably, the Commission will not however treat the subject solely from the point of view of the influence of the Panama Canal, but will enter impartially into the question of *international means of repression of the disease in whatever area found*, as has been done in the case of cholera and plague.

PLAGUE.

Plague in Ceylon.

In discussing the comparative immunity from plague of certain areas in India, there has been more disposition to find some special reason in difference of variety of the flea and rat, and their seasonal fecundity, than to regard such possible factors side by side with the extent and nature of passenger and goods traffic (including the recently discussed question of grain transport) as modified by the sparsity of inhabited areas, their density in population, and the habits of the people concerned. The influence of the type of plague in epidemiology has been overshadowed by the preponderance of the bubonic form, and local departures from this have been merged into matters of "minor epidemiological importance." Hence, the recent outbreak in Ceylon has special interest.

About the 12th January, 1914, there occurred a series of deaths on the north side of Sea Street, which faces the harbour of Colombo. These were returned as due to meningitis, pneumonia, and lymphangitis. There had been no rise in mortality, according to the statistics for the town generally. A communication was, however, received by the Health Officer on the 24th January as to a "mysterious disease" in the locality; when he caused immediate investigation. A house-to-house inspection was carried out. No death or case of suspicious illness in human beings was found; neither were any dead rats or evidence of unusual sickness or mortality amongst them discovered. As the area was under charge of an overseer engaged in rat catching, his evidence, which confirmed this state of things, was of some value. On the afternoon of the 25th, a "sudden death" was registered after high fever of less than one day's duration, a statement which is supported by evidence that "the deceased had been seen going about

apparently well the previous evening." Dr. CASTELLANI, in the absence of the Municipal bacteriologist, was present at the post-mortem, and took samples for examination. Pending his results, which subsequently confirmed the suspicion of plague, energetic operations both as to human beings and rats were conducted.

Reporting on the 18th February, the Colombo Municipal Officer of Health, Dr. Marshall PHILIP, D.P.H., states that the whole 23 cases of plague reported in Colombo up to that date have been septicaemic in type and have been fatal. Only two of these have been females, and 74 per cent. of the males were under 25 years of age. Five persons found dead were ill less than 24 hours (evidence not fully reliable).

At the post-mortem of the first case, there was an entire absence of anything abnormal, beyond slight congestion of the meninges; there was no evidence of haemorrhage, nor of enlarged glands, nor was there any congestion of organs. In two subsequent cases there was intense congestion of the lungs and meninges, but again there was no sign of haemorrhage or enlarged glands.

Between the 18th and 25th February, 15 further cases of plague occurred—all of which were fatal. A case was also reported to have occurred in a village thirty miles from Colombo. Of the total cases up to 25th February, *only one was bubonic axillary.*

There was no lack of rats in the infected quarter, as the Medical Officer of Health reports that, in one night, 564 were captured, of which 159 were from Sea Street. He notes that many of the houses are connected directly with the drain, and that in these rats are numerous.

Between the 1st and 18th February 54 rats were examined by the municipal bacteriologists, of which four were considered to be plague infected, whilst the Director of the Bacteriological Institute found two infected out of 115 rats. The official reports, so far available, do not give the date when the first rat was found infected; but, according to an "Associated Press of India" telegram, no rat was found infected until February 11th. Of a total of 22 rats found infected up to the 25th February, 11 belonged to "the species *rattus* (house rat), seven were *norvegicus* (sewer rat) and four *musculus* (mouse). This is an unusual proportion of infected *sewer* rats, due no doubt to the very frequent connection which exists between the old underground drains and the interior of the houses. The first infected rat found was a sewer rat. Sulphur fumes blown into rat holes in houses frequently cleared the drains."

The following is the statement of the probable origin by the Medical Officer of Health:—

"The source is not known. The infection may have been introduced in any one of a variety of ways; but, as it is practically certain that the first known case was not actually the first, it has been found impossible so far to arrive at a definite conclusion. It may have been introduced amongst infected articles, or an infected rat may have escaped from some ship in the harbour and found its way up one of the numerous old underground drains, which run from Sea Street to the Harbour, and which are neither trapped nor guarded, or which seems the most probable, an infected person may have brought it in from India."

Postscript.—The following is the summary of the events in the plague epidemic in Colombo:—There were 12 cases held to be suspicious of septicaemic plague between the 12th and 24th January. On the 25th the first case of septicaemic plague

was diagnosed. In the total of 46 cases, up to the 26th February, nine cases were bubonic. Since that date and up to the 10th March, 25 cases have occurred in which the differentiation of bubonic cases is not stated, but which it is believed are in the main septicaemic. The first plague infected rat was found on the 5th February.

A remarkable feature of this epidemic is the septicaemic type of the disease; and interest naturally settles round the opinion of the Medical Officer of Health (Dr. Marshall PHILIP) supported by Dr. CASTELLANI* that whilst invasion by infected rats or rat-fleas is possible, introduction by infected man was probable.

The best available evidence on which to test the question of probable cause is that placed on record by the Indian Plague Investigation Committee. Their valuable and elaborate experiments and observations have established to the full the important rôle of the rat flea. Their arguments would, however, go to show that whilst other factors may exist, their consideration in plague prevention is academic. They would teach that man (except as a carrier of infected rat fleas) as a factor in importation of the disease to new localities may be ignored, if not infected with plague of the pneumonic type, when at the worst he might start, in the climate of India, a few similar cases easily repressed. It is well, therefore, to discuss the pros and cons of their attitude in connection with the suggested probability that the epidemic preceded the epizootic.

The drains of the infected houses, neither guarded nor trapped, led to sewers infected with rats. In drains of such nature it would be an easy matter to dispose of discharges, and rags used in wiping them from the sick. The presence in septicaemic cases of bloody mucus with faecal matter and, at times, of blood in the discharges from the mouth and nose must be expected. The Commission experimented by rat inoculation in only 16 cases with human faeces, and in these they carefully excluded blood. When they did get one successful result they blamed their technique as faulty; and there left the matter. In feeding experiments, they chose to regard urine as representative of both the solid and fluid excreta of man in their natural state—thus excluding, not only undigested grains, but blood and mucus in mass as tempting morsels. They admit that the soft feeding of rats would infect and that accidental abrasions are a danger; but because the well-fed and largely immune rats of Bombay, unless fed in laboratory precincts, do not get mesenteric buboes, they exclude infection by feeding in nature in other localities where they may be less well fed; and place all neck and sub-maxillary buboes, which may also be caused by feeding, to the credit of the rat-flea. Recently contaminated floors, they grant, will infect the rat, but pneumonic sputa which are supposed to be crowded with plague bacilli, and bloody discharges of septicaemic cases, do not appeal to them as necessary items in experiment. Either they take refuge in the requirement of floors being "grossly infected," or regard such matters of no import in epidemiology; presumably in the belief that rats will not elect to pass over floors stained with pneumonic sputa or septicaemic discharges till at least six hours after the deposit! As to pneumonic sputa no feeding experiments are on

*CASTELLANI & PHILIP. Plague in Ceylon.—*British Med. Jl.* 1914. April 4, p. 752.

record by them, though Dr. BROQUET in Manchuria infected one in four rats thus fed. Six per thousand rats examined by them had pneumonia (no mean number in huge rat populations), but no effort to imitate inhalation by rats of dust laden with partially dried mucus entangling microbes is recorded. The question of conveyance by flies and ants of discharges fresh or semi-dried, but still infective, to human food has never been touched by them; apparently because they do not take cognizance of the everyday fact that the labouring classes of India (at least in the South) make a light early morning breakfast of *cold food cooked the night before*, when, in mouths abraded by sticks in cleaning their teeth and the cleansing of the tongue and throat by no gentle thrusting of hands into the oral cavity, there should be no difficulty (putting aside the more disputable question of intestinal infection) in securing infection by the mouth and throat and thus septicaemic plague, or neck buboes, without the intervention of the rat-flea. In considering the possible influence of the human flea in contaminating hands, VERJBITSKI's insistence that "clothing and bed-clothes which are covered with material from infected insects obtained either by crushing them or from their faeces can serve during a long time as a source of infection" need not be put aside. In this connection it must be remembered that 74 per cent. of the sufferers up to the 25th February were of the lowest class of Tamils below 25 years of age, and, with the exception of two, were males—bespeaking the daily labourer living under very poor sanitary conditions.

But is there no possibility of human or rat-fleas becoming infected by human septicaemic plague? Again, the Indian Commission put the matter aside as theoretical. They made a microbe count in the blood of cases of septicaemia in human beings. They admit that the condition fluctuates in individuals, but they have hitherto made no attempt to decide the variation of intensity in types of the disease; yet it is held by some authorities that bacteraemia is most marked in the pneumonic type. So far as can be judged by the context, it is probable that the cases used were bubonic approaching a fatal issue. There is nothing to show what might happen in septicaemic and pneumonic cases towards the end. However, they found the proportion of *B. pestis* was in 7 out of 26 cases above 10,000 per c.c. and in one case over 1,000,000 per c.c. The impression they desire to convey is that the flea has but a remote chance of fishing a single microbe from such a blood stream. Now, as a flea's stomach capacity measures, according to them, ·5 cub. millimetre (·38 to ·48 cmm.) why should not the human flea gain, say, 1 to 50 at one meal, and, as it feeds from time to time and bacilli increase in its stomach and tend to remain there, why should it not be in particular types and stages of plague an occasional danger to man as a natural host and as a host of accommodation to rats? At any rate, it is satisfactory to know the Commission obtained an infected human flea in nature.* Curiously enough, so far as we have been able to ascertain, they have not placed

* In an experiment with clothing from an infected house, this flea was arrested by tanglefoot on its way to attack the rat prototype—the guinea pig; at the same time, two rat fleas and one human flea were found on the 26 guinea pigs employed. A just inference is that an infected human flea may attack a rat, and thus start an epizootic. (See *Jl. of Hygiene*, 1907, Dec., Vol. 7, Plague No. p. 889.)

on record a single experiment of attempting to convey septicaemic blood from man to a rat by either rat or human fleas; although in the case of bugs this mode of experiment was used with success by Capt. E. A. WALKER, I.M.S., in Burma*. Experimentally, using the rat instead of the human being as the source of plague, they, however, conveyed infection by the human flea to rats in 3 out of 38 experiments. But, as to the rat-flea, they show it will readily attach itself to man and, even in the presence of rats, if food supply be limited, it will bite him. Of course, this is best exemplified by the death of the rat, and hunger consequent on absence of its natural host. As it happens, in the present case, there existed a combination of factors in nature for inducement of the rat flea to bite man. The area first infected was one which had been recently worked over by ratcatchers, and, consequently, hungry rat fleas might have been present on floors in unusual numbers at the time of receipt of the first imported human case. Such consideration does not, however, diminish the importance of infected man as one of the importing agents capable of starting an epidemic and ultimately an epizootic. Of course, with flea exclusivists, it is a simple matter to dismiss our mode of regarding the subject with the suggestion that, even if there be any foundation for believing there are other factors than fleas and rats concerned in importing plague, they are of "minor epidemiological importance." To this we would, however, reply that the sanitarian is concerned with *prevention*, and, if a minor factor in epidemiology is capable of ultimately putting a major factor (an epizootic) into operation, it is his plain duty to predetermine the best available and reasonable measures to inhibit it—not to ignore it.

We have encountered persons who have asserted that nothing but bubonic plague occurs in the South of India, from which area Drs. Castellani and Marshall Philip suggest infection may have been derived. But, as a fact, both septicaemic and pneumonic plague have been present in the Madras Presidency, and, in certain epidemics, this markedly has been the case and, as in Ceylon, they have *preceded* bubonic plague. Nor in that area, in well-watched populations, do epizootics always precede epidemics; though the former ultimately determine the extent of the latter. On such grounds, we consider that the evidence as yet furnished by the Indian Plague Commission does not suffice to negative the interpretation (with which we agree) of the local officers as to the "probable," as contrasted with the "possible," modes of introduction of the epidemic.

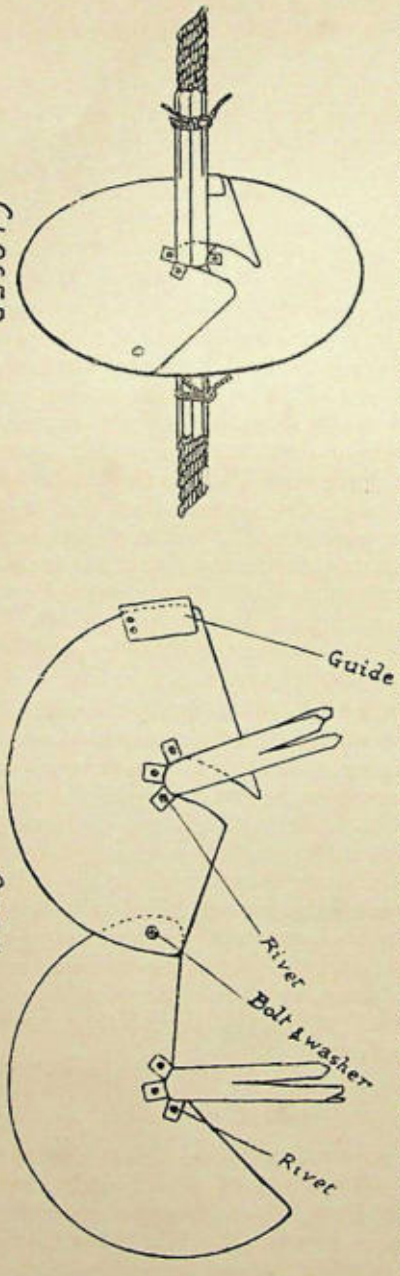
Rat Guards for Ships' Lines.

Passed Assistant Surgeon Carroll FOX† states that, as a result of many consultations by officers concerned in the Philippine Islands, there has been adopted a guard for ships' lines, which he considers to be "an effective barrier against the passage of rats"; whilst it has the further advantage of being "cheap," readily applied, light, and not easily

*WALKER (E. A.). Transmission of Plague in the absence of Rats and Rat-fleas.—*Indian Med. Gaz.*, 1910. Mar. Vol. 45, pp. 93–94.

†FOX (Carroll). The Rat Guard used in the Philippine Islands.—*U.S. Weekly Public Health Repts.*, 1912. June 7. Vol. 27. No. 23, p. 907.

made unserviceable by hard usage." The following is the description given, as well as the illustration of the guard :—



A rat guard for ships' lines. (Diameter of disc 3 feet. Made of heavy galvanized iron with copper rivets. For use on lines up to 4 inches diameter).

" The special features of the guard are these: A single disk in two parts with arms (funnels) from both sides. It is hinged by bolting at the periphery of the disk. There is a guide permitting a perfect opposition of the two parts of the disk when closed. It is adjustable to many different sizes of rope and when placed on the line fits closely by tying on both sides. Rivets are used throughout, thus increasing the strength. The distal portion of the arms is cut longitudinally into three strips so that they may be bent to come into immediate contact with the rope when tied.

" The details of construction as worked out after considerable experience are as follows:—Flat sheet galvanized iron is used for all parts of the guard ; 20 to 24 gauge answers best, for that weight of iron is strong enough and does not make the guard too heavy. The shield should not be less than 3 feet in diameter. The funnel tubes should be 18 inches long on each side of the shield. The central aperture can be made to fit any size of rope. One made for a 3-inch diameter rope will serve for all smaller sizes. When made or used for encircling a number of lines at the same time the shield should be 4 feet in diameter and the funnel tube enlarged and supported by five flanges and five rivets instead of three. The guide piece, which is the one important feature of this guard, is riveted on one side only and then bent around the circumference. The rivets which fasten the funnel tubes go through the tube flanges on each side of the shield. One bolt, two washers, and five rivets are needed for each guard. When badly damaged by use or carelessness, a block of wood and a hammer are all that is required to restore the guard to its former usefulness."

Guinea Worm.

This disease, which is of importance as a cause of labour disability,*

*Under the head of "Parasites," guinea worm accounted for 60 per cent of cases in the Hospital Statistics of the Gold Coast Colony in 1912.

has received considerable attention from Dr. TURKHUD, according to the Report of the Bombay Bacteriological Laboratory for 1912. In famine camps, in the District of Dohab during March 1912, 2,000 cases of guinea worm were found.

At the All-India Sanitary Conference of 19th November 1912, Dr. Turkhud* made the following interesting statement:—"In our experiments at Parel, guinea worm larvae were also found inside stegomyia larvae, but whether they undergo any other further developments in the host is still to be ascertained." He showed that the cyclops follows the embryo and secures it for ingestion, and that the embryo does not pierce the integument to secure entry—thus confirming LEIPER'S observations. In contrast with LEIPER'S work, he obtained no infections in experiments upon twelve monkeys. These have been repeated, and in due time results will be reported. Enquiries in infected villages elicited the information that no instances of guinea worm in cats, dogs, goats, hens or cattle had come to the notice of the people, although these animals partook of the same water as the infected inhabitants. Five persons volunteered to drink water containing infected cyclops. Eight months to a year must elapse before results can be reported.

To this record of experimental data may be added one of ancient date. Assistant Surgeon LORIMER of the Indian Medical Service, in 1838, inoculated himself and four others with the "fluid of the grown guinea worm." Although "the favourite site of ankle" was selected, no result occurred. The necessity for the cyclops as an intermediate host was still to be discovered by FEDESCHENKO.

On visiting infected villages, Dr. Turkhud was able to demonstrate the guinea worm's embryo in the cyclops in 44 out of 114 examined, which is stated to be the first finding of this condition in nature.

He described the method of infection to the villagers, who appeared impressed; but, when it came to altering a well so constructed as to allow them to stand directly over its mouth in drawing water, they objected to its being interfered with, because they feared they would lose their legal rights over it. Such statements are liable to be brought forward as evidence that inhabitants of rural areas in India oppose sanitary advance. The villagers were probably not without some legal ground for thinking that to abandon a well to be repaired by a Public Body, would thereafter touch their private rights. The civil officer in charge of the Taluk, acting on behalf of the District Board, required a petition from the villagers asking to have their well repaired, which under the circumstances was not forthcoming.

The matter is really not one where the sanitary instincts of the people should be in question. Dr. Turkhud had to deal with a condition in which legislation of a nature not invalidating private rights, yet securing the discretionary action by a local sanitary authority, in the public interests, would seem to be requisite. This attitude the Bombay Local Boards Act as well as the Bombay Village Sanitation Act fail to secure. In the Madras Presidency, however, under the Madras Local Boards Act, the matter could have been settled without

*TURKHUD (D. A.). Dracontiasis.—*Proc. Second All-India Sanitary Conference.* 1912. Vol. 3. pp. 118–120. (1913. Simla: Govt. Central Branch Press).

friction. As the clauses concerned give control not only over private wells and tanks but private streams and channels, in a manner obtainable in some countries only by complicated legal methods, if at all, they are quoted. The penalty of interference by a Public Body of having to pay for alterations, etc. is a light matter, when balanced against the saving of life rapid action may secure :—

Section 99, Madras Local Boards Act, V of 1884.

"The President of the Taluk Board, or any person duly authorized by him in that behalf, may require the owner of, or the person having control over, any private stream, channel, tank, well or other place, the water of which is used for drinking, to cleanse and maintain the same in good repair, to provide parapet walls for the same and also to protect any such well from pollution by surface drainage in such manner as he thinks fit, or whenever the said water is proved to the Taluk Board to be unfit for drinking, to desist from so using such water, or permitting others so to use it, and if, after practice, the water of such well, tank or reservoir, is used by any person for drinking, the President of the Taluk Board may require the owner or person having control thereof to close such well, tank or reservoir, in such manner as he may direct, so that the water thereof may not be used for drinking."

In the recent All-India Sanitary Conference, at Lucknow, the question of treatment of water infected with guinea worm was discussed. Dr. Turkhud's recommendation of protecting wells from surface flow and from villagers climbing into or standing over them is of course self-evident, in view of the tendency to get rid of the embryo which the female guinea worm exhibits under dropping water—a method formerly used clinically. One good authority suggested the use of permanganate of potash, but the short account of the discussion so far received points to this as an untried suggestion only. Indeed, the question of treatment of guinea worm infestation by permanganate of potash and other methods is evidently one requiring further experiment. Personally, we have in such cases advised the complete emptying of the well, a matter usually easy of accomplishment where bullocks, irrigating leather buckets (doles) and picotahs are available ; the steining and surroundings of the well were then well cleansed, and all rags found were burned. After the admission of the water, sedimentation by the addition of alum 4 to 6 grs. per gall., with added lime gr. 1 per gall. if a soft water, was employed, on the theory that the structure of the embryo would suffer, as well as be enclosed, by contact with alumina hydrate before deposition. This method, if proved by laboratory experiment effective, would be easily applicable to Indian villages ; as alum is obtainable in bazaars, and its utilization for water clearing is of indigenous origin, and one to which therefore no objection would be raised. In one instance, in a village visited after a lapse of a year where this mode was used, the measures were stated to have been beneficial by the villagers. Possibly, both the guinea worm embryos and the cyclops would object to the presence of hypochlorite of lime.

Irrespective of the radical measure of boiling, a useful direction which appeals to villagers is the securing of a mutual understanding that persons with protruding guinea worm should not be allowed to draw water, whilst bathing in the vicinity, and the deposit of dirty leg bandages which often accompanies the act should be deprecated. On this point, also, there would seem room for experiment. Dr.

Turkhud points out that filtration through a cloth is an effective preventive, and as this is a method commonly practised by Indians when filling their water vessels, it should be decidedly useful. But it would be of interest to know if such cloths were kept damp—the chances being against this in a hot climate—how long the attached infected cyclops or guinea worm embryo would be a danger, if the cloth were reversed in the next act of vessel filling. It would also be of advantage to ascertain how long embryos on rags carelessly disposed near a well, and therefore kept damp, might await in a living condition entrance by surface flow, or attached to ropes and feet, into an unprotected well.

Having regard to LEIPER'S observation that acid solutions of ·2 per cent. free the embryo from cyclops, it would be also advisable to experiment with "acetization" of the contents of wells, as suggested by Dr. MATTHEWS, Assistant Health Officer, Madras City Corporation, against cholera. A further suggestion by Dr. Leiper is also worthy of careful investigation, namely, the use of steam in raising the temperature of infected water as found in definite masses such as wells. As a result of laboratory research, fortified by consultation with Mr. STANLEY PHILLIPS, Lecturer on Physics, Birmingham Municipal Technical School, he has suggested* that complete purification can be secured by raising water to a temperature of 65° C. This can be managed by inserting the nozzle of a pipe deep in the water and passing steam through it, a measure which would imply the use of no greater apparatus than a portable steam boiler, and would therefore be frequently available, even in rural areas. In the matter of prevention also, itwould seem likely that the stocking of infected wells with certain fish would get rid of the cyclops. To the experiments with monkeys, the tracing of what happens to infected cyclops when devoured by fish might well be added.

Dr. Turkhud's enquiry is of a practical nature that cannot fail to be of advantage to employers of labour in India and Africa.

VACCINATION.

Vaccination on the Gold Coast.

The Medical and Sanitary Report for the Government of the Gold Coast, 1912, recalls the fact that Dr. LE FANU demonstrated in 1909 the possibility of animal vaccine being cultivated at Accra. This was followed by the making, at that place, of a small Vaccine Depôt, which enabled Dr. J. W. O'BRIEN in 1911 not only to issue lymph but to conduct experiments on the best method of its transport. He considered that the local product gave results superior to imported lanolinated vaccine or dried lymph sent from England and Germany, respectively. On referring to the latter officer's Report, it is evident that his opinion was formed after troublesome investigation; but establishment of a claim of superiority of one or other method of preservation under tropical conditions can hardly be said to have been secured by data at his disposal. Thus, whilst the age of the locally produced

*LEIPER (R. T.). A Method for Dealing with Town Wells infected with Guinea-worm.—*Jl. London School of Trop. Med.* 1911–12. Vol. 1, pp. 28–30.

vaccine is stated, as well as its method of storage before issue, similar information is absent as to the vaccine preserved by the other two methods—the date of arrival in the Colony only being mentioned. In the statistics of the total cases vaccinated, nothing is said as to whether the percentage reckoned upon is the number inclusive or exclusive of the "unknown"; whilst the totals and percentages of success of lanolinlated vaccine, from lack of details in the text, cannot be co-related.

Putting these details aside, the point of value in the work of Drs. Le Fanu and O'Brien is the establishment of the feasibility of conducting animal vaccination at Accra, and rendering this a centre of distribution, thus securing an economy when contrasted with the cost of importation. Further, inspection of the meteorological tables proves that the climatic conditions of Accra should present no special difficulty as to cultivation of animal vaccine, provided proper buildings were at disposal. Indeed, the history of the establishment subsequent to Dr. O'Brien's Report would show that the chief trouble to be encountered is the irregularity of the supply of calves; and either for this or other reason it is reported that "very little locally made lymph was used during 1912."

We have referred to the previous history of this subject, in respect to the following remark, at page 19 of the Report, made by the Senior Sanitary Officer as to inoculation of calves:—"After an interval of 72 hours, vesicles are scraped off, and the material so collected is weighed. . . . It may be stated in explanation of the early period at which the vesicles are collected from the calf (72 hours) that vesiculation occurs at an earlier period than with the home lymph, and that a longer interval allows pustulation to occur." The success rate on the human being is said to have been 87·94 in 2,378 cases. This rate is by no means poor, having regard to difficulties of transport to outstations; but as, unfortunately, according to the reporting officer, "the table does not separate primary from secondary or other vaccination," it is hardly possible to gauge the success rate of the particular vaccine. It is also not stated to what extent figures are supplied by incompletely supervised native vaccinators. Accepting however the figures as thus qualified, it must be said that the continued use by transfer to the calf of animal vaccine which matures at 72 hours, and thereafter runs to pustulation, contrasts strongly with Indian experience, where the process of cultivation is conducted in certain places having higher temperatures than at Accra. Under such climatic conditions, there is always a tendency to advancement in hours of maturation; but, by selection of typical vesicles and the use of fit animals, and scrupulous care of their environments, it is possible to restore the strain to a better approach to the normal maturation of 120 hours. Indeed, a strain that, in addition to advancement, to the extent reported as existing at Accra, tends to suppuration, would be promptly discarded as no longer typical of sound vaccine.

So far as we know, no observation exists, as to whether persons vaccinated with such atypical animal vaccine are less securely protected against small-pox, as judged by duration of immunity, than if typical material were employed; yet some analogy may be found in the younger age at which re-vaccination of the adolescent is advised in the present day; it being held by some authorities that duration

of protection has diminished, owing to degeneration of vaccine stocks following long transmission away from their original sources. Be this as it may, unless full evidence be available to the contrary, it would seem desirable to issue no vaccine for public use that does not correspond more closely than that used at Accra with accepted standards of type and vigour of animal vaccine. Until such proof be forthcoming, it must be concluded that the present vaccine stock at Accra has degenerated, and that its renewal is necessary. If particular difficulties are experienced in maintaining a stock of standard vigour, on animals that are not easily controllable apparently owing to little domestication, it would seem better to rely upon imported vaccine entirely for *transmission of stock* on animals, *so as to avoid local transfers to a second generation*. This method, at very little expense, would get rid of many difficulties, and would in no way interfere with local methods of vaccine collection and preservation.

The Report records that trouble is experienced owing to infestation of calves by ticks. Animals so afflicted are not desirable, as their grade of health is often low, and the bites on the abdomen are liable to get accidentally inoculated during lymph insertion, and thus give excessive and irregularly placed vesicles. If no choice is possible in the matter, the ticks should be got rid of and the animals be brought into general condition by judicious feeding. Irrespective of patent "dips," in which the active agent is usually a preparation of arsenic, kerosine soap mixture, or solutions of the various tar-derived disinfectants, will get rid of them. Practically as efficient as these, however, is the use of a weed, the *Leucas cephalotes* (Spreng.) as used by Madras ryots. This is pounded so as to make a mash and is well smeared over the animal. This weed is probably widely distributed in the tropics.

The Organization of Vaccination Departments.

In certain areas of our possessions in both East and West Africa, the question of supply of animal vaccine has attracted the attention of workers, but still demands final settlement. In the meantime, the important point of how to use anti-smallpox vaccine with efficiency amongst scattered native populations, and secure from those concerned accurate reports of results, so that the protection of communities may be gauged, remains a much neglected problem. The policy largely pursued has been to reach the native in rural areas, by haphazard methods at the hands of little supervised native vaccinators, and then to expect them to believe so implicitly in the British "Ju-Ju" as to discard inoculation and other injudicious customs. Yet, it would seem essential that in dealing with a population possessed of views as unfounded, but probably quite as strong, as those of British anti-vaccinators, details of organization should be of that complete nature that should ensure the gaining of faith *pari passu* with the offer of the prophylactic method; even if finance limited first efforts to a few square miles, so that failures to protect should not become an advertisement of inefficacy. Where native vaccinators possessed of poor general and technical education and without close inspection by special officers are solely employed, expenditure in providing good lymph will not secure efficient vaccination. The negro certainly does not show any immunity against small-pox; hence, it seems paradoxical that so much effort should be made to prevent him dying from

malaria or sleeping sickness, whilst he is left largely to his own devices in respect to that terrible disease. In short, in parts of East and West Africa where it is deemed that well conducted vaccination will be tolerated by the natives, Vaccination Departments should be placed on a sound basis of trained technical *personnel*, having a definitely estimated relation to area and population.

This necessity for improved methods for organization in the territory of the Gold Coast Government is thus forcibly referred to by the Senior Sanitary Officer (Thomas C. RICE) in his Report of 1912 :—

"I am convinced that a determined effort should be made to secure the efficient and systematic performance of vaccination in a manner that will impress upon the natives the importance attached to it by the Administration. The subsequent disappearance of small-pox will afford evidence as to its efficacy. I advise that a Medical Officer, assisted by educated and intelligent natives, be appointed as a Vaccination Officer to each Province. When, after a few years, the bulk of the population has been efficiently vaccinated, and the native taught to appreciate its value, the work can be carried on by the natives trained by the vaccination officers—subject to occasional European supervision."

HOUSE FLIES AND DISEASE.

Flies in Delhi.

In 1911, the Delhi City (population 232,837) had a death-rate of 59·58 per mille per annum. The recently appointed Health Officer of Delhi (Major COOK-YOUNG, I.M.S.) has therefore no mean task before him. In only one matter is he to be congratulated; he is well supported in funds and influence by the Government of India, and is therefore in an excellent position to afford a good "object lesson" of applied hygiene in India. It is reported that, as a result of his efforts, the death-rate has sunk from the heavy figure stated to the still heavy, but improved annual rate of 44 per mille.

A complete sanitary survey of the city is being made; considerable mosquito reduction has been effected—so that comparison of a six months' period of 1912 with the same period of 1913, exhibits a reduction from 6,000 deaths from malaria to 4,200. Plague and cholera did not become epidemic during the year—imported cases only being detected and treated; a result that could not have been attained without untiring and close sanitary surveillance of the people. He has been able by insistence on sound conservancy to make a reduction in flies that is manifest to a somewhat apathetic public. This result is thus alluded to by the *Allahabad Pioneer* of the 11th February :—"The key-note was that the city must be clean . . . . if breeding places are found, flies can be stamped out in ten days . . . . Those who saw the troops marching through the city at the Durbar, every helmet a lodging place for a host of flies, would perhaps not credit that to-day hardly a fly is to be seen anywhere along the route that was taken, and that the reduction has been materially the same throughout the city." This is an encouraging statement from a lay paper; before, however, a decision is arrived at as to the extent of influence on flies of improved conservancy, the Health Officer's Report showing comparative seasonal meteorological conditions, and the extent to which the presence of the masses of troops and animals at the Durbar was an aggravating condition, must be awaited.

Flies in Poona.

In Poona, amongst European officials, European troops and Indian prisoners in the Central jail, diarrhoea and dysentery showed a considerable increase in the years 1911 and 1912 when contrasted with the year 1910. Investigation on this subject as conducted by Captain MORISON, I.M.S., is detailed in the *Report of the Bombay Bacteriological Laboratory for the year* 1912. He first ascertained "that the prevalence of diarrhoea and dysentery follows the increase in the humidity of the atmosphere which is associated with the monsoon rainfall, a point which has generally been recognized in previous years; and, secondly that with the advent of the monsoon flies become a pest in Poona." To gauge their incidence, he placed fly-papers in houses and studied the "fly counts" side by side with meteorological conditions. A disturbing factor in deciding these counts came to notice, in the tendency of enthusiastic householders to add papers; so that his records on this point had to be exact. Incidentally, it was found that in one house "a slight alteration of meals to accommodate a guest, who remained three days, increased the fly catch from 234 to 500, 462, 466; after his departure, the numbers fell on successive days to 296, 300, 290, and 250."

Captain Morison's observations showed that there was a close connection between fly counts and the occurrence of diarrhoea. It was however found that flies "were few in September and practically absent in the closing months of the year; so that the small epidemics of diarrhoea, which occurred among the men of the Loyal Lancashire Regiment in the fourth week of September and in the week ending the tenth of November, cannot have been caused by flies."

Nothing is recorded to show whence, if flies were the main factor, the infective agent was carried; although such suggestions as the presence of special salts in the drinking water during the rains, the milk of cattle fed on new pasture are held refuted, whilst "the presence of certain flagellates in the intestinal contents have been proved to have no relation to the disease." "The bacillus dysenteriae of Shiga and Flexner and Morgan's No. 1 bacillus were found in the stools of patients." The investigation is to be continued for another year. In the meantime, however, the apparent trend of this paper is towards a "carrier" theory.

All factors possibly connected with this outbreak will doubtless be fully considered in the final Report. We suggest that further data as to water than the presence or absence of excessive salts are desirable. A point that may prove of some importance—if the question of distance from the locality concerned and seasonal incidence do not put it aside—is that Poona is one of the few places in India where night-soil is of value, and its use is largely resorted to in a comparatively fresh condition for sugar cultivation in the immediate neighbourhood. The period of sugar cane cutting also should be held in favour by flies.

The occurrence of diarrhoea in Poona corresponds with the South-West monsoon. In the Madras Presidency, it has been shown (W. G. KING) that if the incidence of cholera according to months and the populations affected (which numerically are very different) be proportionately treated, it occurs chiefly with the S.W. monsoon in the Districts which depend upon this monsoon, whereas in the other

districts, whose chief monsoon is the N.E., the incidence is in the latter period. It would thus be of advantage, in connection with Captain Morison's tracing of association of diarrhoea and dysentery with the monsoon rainfall and fly prevalence, to make a contrast between the N.E. and S.W. Districts of Madras.

Destruction of Insects.

Mosquito Traps.

The *Canal Record* (Ancon, Canal Zone) of the 11th February* contains the description of an insect trap, invented by Mr. Charles H. Bath, Division Inspector in the Department of Sanitation, which is covered by a patent. This consists of a wire mesh arrangement that can be fitted on an opening in a room, so as to trap mosquitoes in attempting to enter or leave it; his opinion being that mosquitoes are attracted by the scent of human beings. It can be used detached and placed in position in the open, so as to use the lure of a light. It is of utility not only as to mosquitoes but flies. The apparatus utilizes the fact that mosquitoes readily enter the base of a cone, and leave through the apex passage ways which are provided, but refuse entry at the apex. The following is the account given of results when in use :—

"A series of tests conducted at the former labourers' barracks at Miraflores in 1911, covering a period of 71 days with 44 traps set in eleven barracks, and with the average of 14½ traps in use per day, showed an estimated daily catch per trap of 96 anopheles, or a total of 1,392 per day. The total estimated number caught during the entire period of 71 days was 98,832. One of the traps that had not been cleaned out for several days contained a thick layer of mosquitoes, flies, moths, and other insects. The dead anopheles in this trap amounted to several thousand. In an average of 6 traps daily for 60 days over 37,000 anopheles were caught and counted. The largest catch on record in one night, in one of these traps, was 1,018 anopheles."

Bug Traps.

A bug trap was, in former days of less evident hygiene in India, held to be a part of the officially provided equipment in jails and hospitals. This consisted of a piece of wood of about 18 inches in length and 2 inches in thickness divided longitudinally into two halves. The lower half was semi-perforated with holes. The upper half could be adjusted so as to form a lid to prevent exit of bugs (during the act of removal) which were induced to take shelter by the trap being placed in likely places such as beds. On the same principle, a tropical helmet placed in likely positions forms an excellent trap, as bugs approve of shelter to be found in the corrugated ventilation ridge round the rim. They can be effectually dealt with by holding the helmet over burning sulphur.

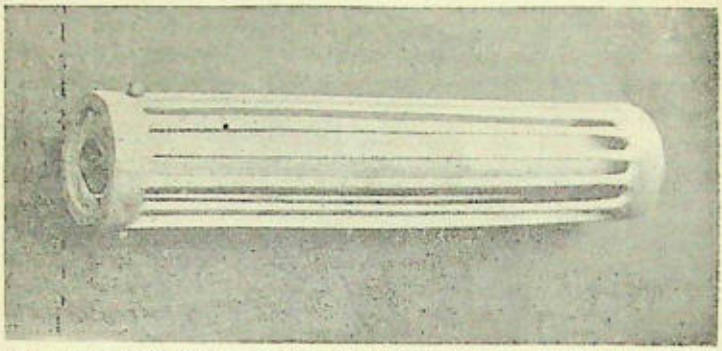
Insect Traps.

Dr. Hindle gives in the *Proceedings of the Cambridge Philosophical Society*† the details of a simple flea trap in use by the Chinese. We

*Insect Trap. Local Invention, designed chiefly to catch Mosquitoes by means of Human Scent.—*Canal Record*, 1914, Feb. 11, Vol. 7. No. 25 pp. 239–240.

†Hindle (E.). A Chinese Flea-trap.—*Proc. Camb. Phil. Soc.*, 1913. Vol. 17. Part 3.

reproduce the photograph of the arrangement and its description, as it may prove a useful adjunct in plague prevention :—



(Reproduced from the *Proceedings of the Cambridge Philosophical Society.*)

"The apparatus consists of two pieces of bamboo one inside the other. The outer bamboo is about one foot in length and 2½ inches in diameter and is fenestrated in the manner shown in the accompanying photograph. The inner bamboo is of equal length but only about an inch in diameter, and is kept in position within the former by means of a short wooden plug.

"The manner in which the apparatus is employed is as follows :—The two pieces of bamboo are first separated by removing the wooden plug. The inner bamboo is then coated with bird-lime, or some similar sticky substance, and put back in position within the fenestrated bamboo. The function of the latter is protective and prevents the sticky surface from coming in contact with any large objects. The whole trap can now be placed under bed clothes, or amongst rugs, etc, and any fleas that get on to the surface of the inner bamboo at once stick to the bird-lime and are thus caught."

Bats as Mosquito Destroyers.

At a meeting of the International Institute of Agriculture in Rome, Dr. C. K. Z. CAMPBELL recommended the introduction of bats into localities in aid of mosquito extermination efforts. He made a special building at a cost of £240 near the edge of a Texas swamp ; in this swamp 1¾ million cubic feet of sewage were daily allowed to flow. The case he dealt with was, therefore, presumably, one of nuisance from culices. He believes that each bat could consume in due course 500 mosquitoes daily ; and, as his bat population in due course increased from a few hundred to over 500,000, he concluded that the bats, during seven months, consumed 50,000,000 mosquitoes. Irrespective of this service, they produced 20 tons of guano which sold at £6 per ton.

As a commercial undertaking the arrangement was apparently sound ; and if the town concerned selected so inappropriate a method of sewage disposal, it is unlikely that human beings contested with bats the pleasure of living in the neighbourhood of the swamp. In inhabited areas, ordinary methods of mosquito reduction are not likely to be abandoned in favour of the introduction of 500,000 bats.

Crude Carbolic Acid as an Agent for destroying Mosquitoes.

Whilst employed in the Panama Canal Zone Dr. ORENSTEIN* made

*ORENSTEIN (A.) Ueber Rohkarbolsäure als Mückenvertilgungsmittel. —*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 837–838.

the following experiment with crude carbolic acid as an agent for destroying mosquitoes. A square wooden frame without bottom was made, 1½ meters in the side and 0·3 metre in depth. This was sunk to the level of its upper edge in swamps containing mosquito-larvae, so as to circumscribe an area containing water and vegetation, 2¼ square metres superficially, and having a cubic capacity of 0·675 of a cubic metre. By means of a glass syringe 100 cc. of crude carbolic acid was sprayed over the included area, and then samples of water were taken at short intervals to see if the larvae were dead. It was found that half-an-hour sufficed for this purpose. The experiment was then repeated at another spot with 60 cc. of carbolic acid only, and it was found that twenty minutes sufficed to kill all larvae.

The author's conclusion is that this is a serviceable method of destroying mosquito-larvae, where paraffin oil is not available and the water is not required for domestic purposes. A quantity of 200 cc. of crude carbolic acid would seem to be sufficient for 900 litres of water.

The solution of carbolic acid used contained about 20 per cent. of pure phenol.

The Employment of Larvivorous Fish in the Bismarck Archipelago as an Anti-Malarial Measure.

At the instigation of Dr. Ruge, the Government of New Guinea, after two failures, recently attempted to acclimatise larvivorous fish in the Archipelago.* In this third and successful attempt, four species of fish, *Galaxia scriba*, *Macropodus viridiauratus* (the Paradise fish), *Cassiops Galii*, and *Pseudomogul signifer* ("Blue eyes") were imported from Sydney. The fish were placed in glass vessels; and, in spite of the addition of fresh water and a water plant, *Valisneria spiralis*, the mortality was considerable; 50 per cent. of the paradise fishes died, but all the Galaxias lived. On arrival in Rabaul, the fishes were placed in a cement tank, where it is proposed to breed them and later to distribute them throughout the Archipelago.

The author fails to state how the fish were fed on the journey. Apparently, some form of cakes or biscuits was employed, which may not have been the food required by these fish. The late H. Thomas, I.C.S., Madras, in "The Rod in India," and in an official Report, made a suggestion as to transport of fish that may be useful to those who consider that in tropical countries, where mosquitoes are in plenty, Nature has not also provided, amongst others, sufficient voracious fish enemies. Long before Ross had demonstrated the rôle of the mosquito in malaria, Thomas had come to the conclusion that mosquito larvae formed excellent food for young fish during transport. For this purpose, he placed the larvae between layers of damp flannel, and was able to preserve them alive for periods which, in these days of steam transport, would suffice for most transfers from one tropical region to another. He was not content also with merely giving fish fresh water in their tanks, but advised oxygenation by agitation and the use of the bellows. A further method of feeding on which he placed faith was

*Börnstein. Zur Malariabekämpfung durch moskitolarvenfeindliche Fische im Bismarckarchipel.—*Arch. f. Schiffs- u. Trop.- Hyg.* 1914. Jan. Vol. 18. No. 1. pp. 21–26.

employment in the tanks of small varieties of snails—as to the continuous life of which there would be little doubt. These latter take readily to biscuits as food. Where transport of grown fish in bulk is not easily carried out, he strongly advocated another method peculiarly applicable in tropical climates—and this we quote verbatim :—

"Long before the commencement of pisciculture as a science Aristotle, and subsequently Mr. YARREL and Sir J. Emerson TENNANT (and I since find BUCHANAN also) had observed that 'the impregnated ova of the fish of one rainy season are left unhatched in the mud through the dry season, and from their low state of organization as ova, the vitality is preserved till the recurrence and contact of the rain and oxygen in the next wet season, where vivification takes place from their joint influence.' . . . It would seem therefore, that we need not seem disheartened with the objection that ice and moss are not as easily procured in India for the transportation of ova as in England. We have at least reasonable ground for entertaining the hope that in the tropical heat of India there is placed readily at our command an equally potent, much more simple, and much less expensive, means of suspending the animation of ova encased in some dried mire. There are numerous instances on record of vivified fish also, (of particular sorts) both as fry and as matured fish also, being thus kept alive during the drought, and the crocodile aestivates in the sun-burnt clay of a Ceylon tank in the same way as the alligator of the Mississippi hibernates in the frost. This interesting fact in natural history may be made of practical use in pisciculture, and the experiment would seem to be at least worth a trial. . . . . If the suggestion prove practical, pisciculturists of tropical climates would be at no disadvantage but rather the contrary as compared in this respect with the pisciculturists of Europe."

In a letter to the *Madras Mail*, under the title of "The Gourami" (probably written in 1884), the same acute observer of the habits of fish in the tropics made an observation which, in the absence of Ross's proof of the connection of anophelines with malaria, naturally attracted no attention at the time. It is one which however is now well worthy of investigation. Writing of Gourami (*Osphromenos olfax*) he said "my six little fry certainly take mosquito larvae very freely, though they *show preference among the different sorts of such larvae*" (italics not in the original). This opens the possibility of certain fish fry preferring anophelines—a matter of vast importance in connection with the chronic discussion of the presence or absence of malaria following irrigation of crops in the tropics.

SANITARY LEGISLATION.

Larvae Cases.

Under this term, Colonial Medical and Sanitary Reports refer to instances of persons who harbour larvae of mosquitoes within their premises. The test of a charge made in the Police Courts is that larvae of mosquitoes were actually found by an Inspector. This form of ruling is passed from Administration to Administration as suitable. Yet, in the hands of a clever lawyer an excellent defence could be made, and a lay sanitary subordinate be given a "bad time" on the subject of identification of larvae. A more generally useful ruling would be to define receptacles, and conditions under which water may exist on premises liable, *in the opinion of the local authority as advised by its Sanitary Officer*, to facilitate the breeding of mosquitoes. Instead of securing a fine on proof of existence of larvae, it would seem safer to insist upon removal of the inimical conditions of the premises within a time specified in each case by notice, and, in the event of failure, to allow the local authority to be in a position to recover the cost of improvement of a type preventing recurrence.

Vital Statistics in Plague Prevention.

A point of practical importance is disclosed in the reports received of the Ceylon plague epidemic. When the mortality rate in Sea Street appeared before the Health Officer, merged into the statistics for the whole town of Colombo, the rise in the death rate was not sufficient to arrest attention In the South of India this possibility is guarded against by the Plague Regulations requiring that in a municipality declared to be "imminently threatened" (and consequently classed for preventive measures as "under observation") the statistical returns shall be rendered weekly for wards or divisions with their respective populations. Under such circumstances, irrespective of plague usually starting in defined zones, any fluctuation readily attracts attention.

Rulings.

Uganda Protectorate.—Under existing Ordinances, the Uganda Protectorate has passed a ruling defining syphilis as a "dangerous disease." In this it has preceded a possible outcome of the Royal Commission on this subject—in Great Britain. A further excellent advance has been made in requiring a license supported by a Medical Certificate for places for the manufacture of soda-water and ice. Both efforts are in advance of existing conditions in Great Britain. We may, however, state that the licensing of such factories and their subjection to sanitary inspection was required in the Madras Presidency in 1897, under the then amended District Municipalities Act of 1884.

Sierra Leone.—In Sierra Leone (Bonthi and York Island) it has been ruled that no building should be proceeded with unless the site be approved by the Medical Officer of Health. The next effort should certainly be to require that plans of intended buildings be also approved, *before* their erection is commenced.

TREATMENT OF WASTE.

Small Rubbish Incinerators.

Incineration of the destructible matter of the rubbish of communities is an ideal constantly held in mind by the sanitarian in the tropics, not only in reference to the getting rid of microbe bearing materials and matter suitable for the breeding of flies as "carriers," but to gain that economy in transport which conveyance to areas distant from dwellings forbids. The large patent incinerators of various patterns, fitted with forced draughts and labour-saving devices with more or less success, meet requirements not only of rubbish, but, to some extent, of excreta disposal. Such expensive installations are however out of the question for small communities; and there is, consequently, a constant striving to find some cheap form of incinerator that will fulfil the needs of villages, camps, jails, hospitals, etc. Hence, from time to time, a new "small incinerator" is discovered, but is put aside after so short a run of popularity as to prompt the question whether small rubbish incinerators have not greater limitations of their range of utility than is generally recognized. The truth would seem to be that if forced draught, added fuel, and labour-saving accessories be omitted, it is not so much a question of this or that pattern of incinerator which decides the selection, as the character of local rubbish in respect to richness in destructible matter, and the climatic conditions which tend to collection in a wet or fairly dry condition. For example, in Bombay City, with a type of incinerator (the "Garlick") used some years back, it was found that rubbish when fairly dry could be consumed at 120·4 cartloads per day, but when wet this decreased to 84·2 per day. In short, whilst bricks can be made without straw, water cannot be evaporated without the attainment of definite heat, and this must be attained before incineration can occur.

A good example of a small incinerator being approved in one locality but being regarded as useless in another is found in a paper by Dr. Angus MacDonald, Health Officer, Kingston, Jamaica, in the February number of the *Journal of State Medicine*.* He adopted a form which was used on the West Coast of Africa. From his description it was of the type sanctioned by the Gold Coast Government in 1910, which superseded the so-called Elmina domed-shaped pattern. It possesses a chimney 15 feet in height, sloping half bars, a feeding door at the upper end of the slope, and suitable details as to air entrance. He found however, as the local rainfall was inconsiderable, rubbish burnt just as quickly and effectually in the open air. Dr. MacDonald describes the burning of Kingston rubbish at the edge of marshy land he is desirous to fill, and then the classing of the unconsumed debris, so that the larger miscellaneous matters such as worthless bottles, tins, scrap iron, bricks, etc. should form the bottom layer of the deposit; on this layer, he superimposes the earthy and, finally, the small and hard debris. As a result, in a rubbish dumping site he has no flies, and the breeding of stegomyia is stayed by the judicious step of quickly burying on the bottom layer receptacles that might contain water.

* MacDonald (A.). Sanitary Conservancy in Kingston, Jamaica.—*Jl. of State Med.* 1914. Feb. Vol. 22. No. 2. pp. 112-120.

The latest addition to small incinerators is one known as the "Griffith." It is being used within the Corporation limits of the City of Madras. The plans show a circular brick chamber 3 ft. 7 in. in diameter, having a wall 4 ft. high covered in by a dome of 1 ft. 9½ in. in radius. The hearth has three superimposed round iron grids, separated by intervals of nine and eighteen inches; the object of this is unstated, but presumably, draughts might be favoured if the bulky and less consumed portions were retained on the uppermost grid, whilst the smaller are allowed to pass by gradation to the two lower instead of choking voids in the main chamber. An iron chimney is fixed in the centre of the dome, and is to vary from 15 to 25 ft. high, according to distance from habitations. Loading is effected through an iron door in the dome. With the exception of the grate, therefore, the incinerator is similar to well-known types. There is no provision for a shelter shed for rubbish pending incineration, which would seem essential during the wet season. It is, however, in the direction of working that speciality is sought. It is held "if the incinerators are to work properly a system of careful sorting and screening should be laid down and insisted upon." It is stated that one of these small incinerators will consume from 12 to 15 cartloads, of 35 cub. ft. each, per day—32 cub. ft. being, we suggest, probably the real average. The possibility of economy in transport would, therefore, largely depend upon whether habitations were scattered or concentrated, and whether roads were radial or there was a single main road; and, above all, whether a closer site to the town than ordinarily estimated can be secured. Taking the matter at its best, perhaps two-thirds of a two bullock-cart at, say, Rs.30 per cart per mensem, might be saved when contrasted with dumping within one mile of a town. Against this, however, must be placed the pay of three coolies to maintain the incinerator working, at a total cost of not less than Rs.18. In practice, the cartman will arrive at the depôt alone. The rubbish he will dump, but will not lift. Three coolies will therefore have to lift at least ten tons of rubbish (which in wet weather might weigh considerably more) *minus* the incombustible portions which must be sorted by manual labour, of a selective and therefore slow character, whilst the remnant is to be lifted an unstated height, and passed through an expanding screen. The screened material is then to be collected and burnt, whilst the rejected material is to be placed in neighbouring hollows. Lastly, if faecal matter occurs in the rubbish, it is to be separated out. The Madras city coolie sweeper is by no means a stranger to the occurrence of faeces amongst rubbish. He is quite willing not to see it, but it will probably be found quite a different matter when he is asked to separate it out. This would be the work of the toties or scavenger caste, who are more expensive office-bearers than the type of coolie who handles rubbish. Putting aside this difficulty, the chances are that if a Municipality possesses sweepers sufficiently conscientious, with occasional supervision, to deal thus in detail with rubbish, few would be found physically fit to deal daily throughout the year with the weight of rubbish in the manner indicated. As the whole success of the scheme would depend upon sites close to dwellings being selected for incineration, any failure to completely burn the daily loads would favour the breeding of flies as "carriers."

As already indicated, the claims for special efficiency of the "Griffith" incinerator rest not so much upon its pattern as upon the introduction of separation and screening involving repeated handling, which would introduce several uncertain factors in economy. On the whole, therefore, when proximity to dwellings of a rubbish disposal site demands destruction of material in incinerators not employing forced draught, and dealing with estimated quantities, it would seem that economy is more likely to be attained by Dr. Angus MacDonald's method of using the incinerator (with or without protection by sheds, according to climatic conditions) in a dumping ground, there being no further handling than required in the classification he describes. In filling marshes by his method the use of light rails would facilitate work.

SANITARY WORKS.

To "Meet Changing Views."

About twenty-two years ago, the Municipality of the town of Mandalay (present population 138,299) considered the introduction of a public water supply a necessity. With the modesty of a young Corporation, they thought of utilising the source of supply of King Thebaw's Fort moat. It was not difficult to show that, sanitarily, this was not a desirable source; so an "authority" evolved a very reasonable subsoil water scheme situated near the river. But another authority held that this water was too hard, and specially urged that to Burmans the soft water of the Irrawaddy was peculiarly acceptable. Thereafter, another authority appeared, who pointed out that the plant for pumping from the Irrawaddy, on the first monsoon after its establishment, might be left high and dry—by a river never to be relied upon two years on end to abide by a previously selected course. But, in due time, another authority appeared, who showed how absurd it was to go to the enormous expense of long pipe lines necessary in pumping from the river or the subsoil source in its proximity, seeing that bored wells within the town area would give all that is required. Then the other inevitable man appeared, who held that the bored well theory must be received with certain limitations not applicable to the subsoil scheme and that, in any case, as power for pumping would imply a perpetual charge upon the municipality, both schemes should be avoided if possible, but advised that before any decision was arrived at, an exploration of the neighbouring hills catchment areas should be made to ascertain whether a gravitation scheme was feasible. When this was prepared, an authority found one of the suggested sources of supply undesirable; and the latest intelligence on the matter is that Mandalay will probably revert to a *new* bored well scheme. Throughout these twenty-two years these schemes have meant much special labour, not only in surveying various areas but in preparation of estimates.

Considered from the point of life-saving, the delay is to be deprecated; and accordingly it was a subject in which the Government of Burma felt it necessary ultimately, in the public interest, to insist upon a decision being arrived at. But, putting lapse of time out of question, the facts bear with them a moral as to sanitary administration, which it is well for those serving in the tropics to hold in mind. It is that, when the water-supply of a large town is under consideration, not this or that man's inspiration and selection of a source should alone be brought to notice; but that all possible schemes should be carefully discussed by the sanitary and engineering authorities, after examining the areas concerned in company; so that, when differences of opinion arise, and where more than one scheme may appear to have sanitary and financial merit, at least an approximate estimate should be made. In this way final answers can be given in reply to the suggestions or objections by sanctioning authorities. This method may be held to imply unnecessary waste of time and labour; but, on the other hand, it must be remembered that saddling a town with a hasty and ill-conceived scheme, for which the people may be taxed for thirty or more years, may be as bad, sanitarily, and often worse,

financially, than if 22 years were allowed to elapse in spasmodic action.

It would be a mistake to conceive that Mandalay stands convicted of unusual conduct. Our details could be easily capped by references to towns in Europe; nor is such delay confined to the knotty points of sanitary schemes, as witness the contentions as to designs both under the French and the Americans, which preceded construction of the Panama Canal.

Our object in referring to this instance is that such circumstances are peculiarly liable to occur in our tropical possessions; for the simple reason that the men who propose or who support this or that scheme are liable to transfer from localities dealt with, or are victimized by tropical diseases and disappear temporarily or permanently; when, as a sequel, there becomes applicable the proverb *autres temps autres mœurs*. Nor is the variability of official opinions the sole point to be considered; there is the important matter, in deciding upon the outlay of public funds, as to relative importance of various schemes for sanitation. An influential member of a Local Body is at all times capable of focussing attention on a favourite scheme to the confusion of real sanitary urgency.

Hence, we regard the following recent Order of the Government of Madras as one that might with advantage be imitated in principle by other sanctioning Authorities dealing with sanitary administration in the tropics; albeit that there is an undesirable loop-hole for the avoidance of the spirit of the ruling in the phrase "in consultation, if necessary, with the District Medical and Sanitary Officer, or the Sanitary Commissioner." It should, however, be added that as the phrase is probably meant to admit of an official convenience, solely in respect to a class of schemes where it is self-evident no second consultation as to order of urgency is requisite, the loop-hole is likely to be a danger only in the absence of a ruling correctly co-ordinating sanitary with sanctioning authorities :—

"Since 1908 the Government have been in a position to make substantial grants to local bodies for the purpose of enabling them to carry out sanitary projects which cannot be financed from the resources ordinarily available. The annual distribution of the assignments allotted for this purpose presents considerable difficulties and it is not always easy to decide between the various competing claims. The original practice was to restrict assistance to fully matured schemes or works of a permanent authority. This restriction was subsequently modified so as to permit of applications being made in respect of schemes which had reached such a stage as to make it reasonably certain that estimates would be duly sanctioned by the commencement of the year in which the grant was payable. All applications for assistance from the sanitary grant are due with Government not later than the 1st October and instructions have recently issued laying down that advance lists of proposed projects shall be forwarded to the Sanitary Commissioner in order to enable that officer to arrange his tours of inspection so as to permit of any local examination which he may consider a necessary preliminary to forming his opinion on the merits of particular claims. As the Government ordinarily defer passing orders on the distribution of the grant until they are in possession of the Sanitary Commissioner's opinion, this procedure should make it possible to deal promptly with the applications put in without risk of making assignments in aid of ill-considered proposals. But while the Government are thus placed in a position to judge whether individual schemes are deserving of assistance, the original selection depends upon the local body concerned and there is frequently no guarantee that sufficient

consideration has been paid to the relative importance and urgency of the various local requirements in regard to sanitation. This difficulty has been met in some cases by framing a definite and comprehensive programme of works intended to be spread over a series of years, the various items being arranged in order of priority. The Government desire to commend this procedure to all local boards and municipal councils. If the question of priority is carefully worked out in consultation, if necessary, with the District Medical and Sanitary Officer or the Sanitary Commissioner himself, the preparation of estimates can be taken up in order of urgency and the annual applications to Government for assistance from the Provincial grant will form part of a systematic plan of operations instead of being based upon the changing views of those who happen to be in authority at the season of the year when it becomes necessary to address Government. The action taken with reference to this advice should be specially noticed in the annual administration reports of local boards and municipal councils."

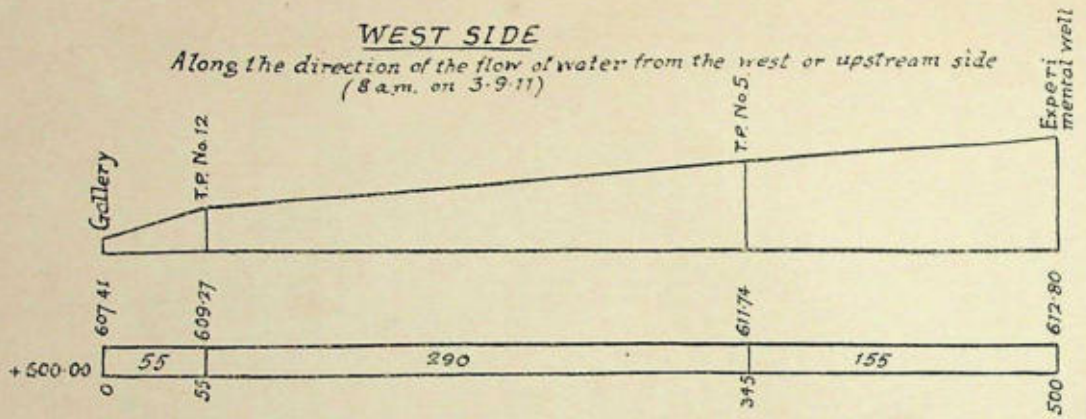
Infiltration Galleries.

Given a pure and readily permeable subsoil tapped for its water contents by a gallery, the sanitary engineer has at disposal a method of water supply which may, in the presence of sufficiency of yield, get rid of the necessity for storage reservoirs, filter beds, and perhaps even a balancing or service reservoir. If the position of the gallery is such that sufficient head is at disposal to command the town, to these economies he may add the absence of recurring charges for pumping by arranging a gravitation system. Hence, in tropical countries an infiltration gallery with a rich supply of water is ordinarily a welcome and cheap addition to sanitary effort. Not uncommonly, favourably placed galleries may yield 120 gallons or more per 24 hours per square foot of bottom. Ordinarily, such schemes do not present many engineering difficulties, and it is therefore interesting to find conditions which at times militate against their full success.

In a Report by Mr. Gnanaprakasam, Asst. Sanitary Engineer, (embodied in Madras Govt. Order No. 42M dated 6th Jan. 1914) an explanation is forthcoming of difficulties which have been encountered with the water supply of the town of Tirupati, for an estimated population of 24,000. This is a gravitation system from an infiltration gallery in the right bank of the River Kalyani, intended to tap the subsoil water before its flow to the river. The lead to the service reservoir being over 36,000 feet, and the municipality being impecunious, the sanitary engineer of the period in evolving the scheme advised resort to the cheap expedient of cement instead of cast-iron pipes; the pressure anticipated being inconsiderable. This effort towards economy, however, very shortly resulted in trouble. The cement pipes of nine inches diameter necessarily were rich in joints, and, in spite of ordinary care in making them watertight, roots of trees soon made their way into them; so that, by blockage and leakage, the total flow was diminished by 73 per cent. This also resulted in a heavy yearly charge for clearing. Even when this was accomplished however, the pipe line was found not to give the calculated yield, which in this case was, in a gallery 330′ × 6′, only of the modest amount of 250 gallons per minute. There is no reason to doubt the care with which the original tests of the yield of the gallery had been made, or that due deductions were made for dry years; yet, when it was anticipated that in a dry year the water would stand in the gallery at not less than 6 ft. 8¼ in. above the outlet pipe, it was found in practice

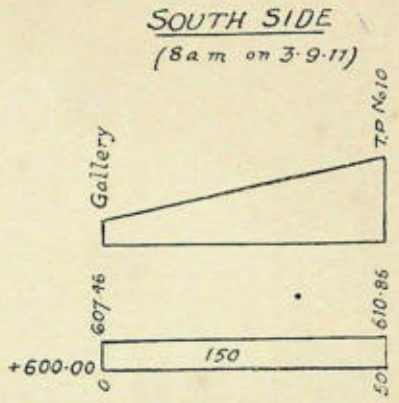
WEST SIDE

Along the direction of the flow of water from the west or upstream side
(8 a.m. on 3·9·11)



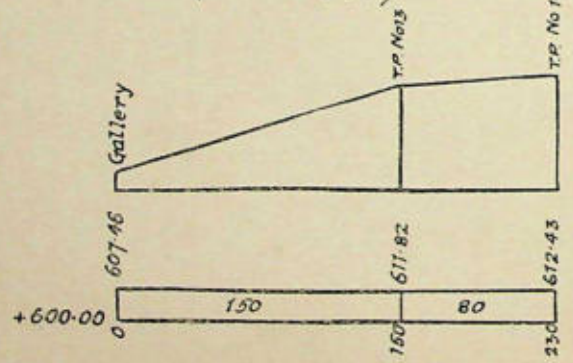
SOUTH SIDE

(8 a.m. on 3·9·11)



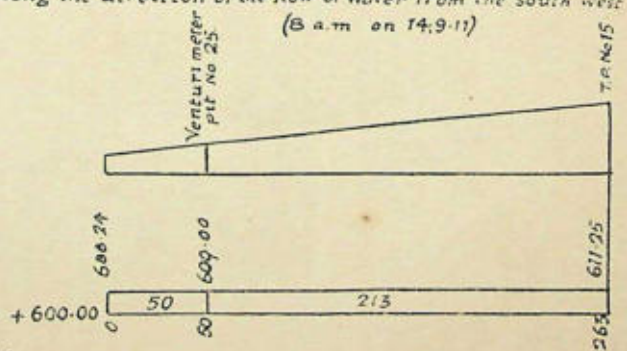
NORTH SIDE

There is very little or no direct flow of water from the river
(8 a.m. on 8·9·11)



EAST SIDE

Along the direction of the flow of water from the south west side
(8 a.m. on 14·9·11)



Scale { Hl 1" = 100'
Vl 1" = 10'

to be depressed to the same level; so that, as the first 1000 feet of the discharge pipe were laid flat, in trust of enough head to overcome resulting friction, discharge was so greatly diminished that, to secure flow, intermittency of supply was necessary to allow of the gallery filling up to the required level.

The circumstances under which diminution of yield below anticipation was brought about have been worked out carefully by the reporting officer. Put briefly the difference in yield is found to depend largely upon the fact that, in construction, the outlet pipe pierced a not readily permeable ridge of mixed clay and kunker (lime nodules); so that leakage occurred along the course of the pipe from what proved to be an unexpectedly restricted subsoil area for supply of the gallery. The configuration dealt with was of an unusual nature; in calculating the yield by pumping tests with the gallery wall unpierced at that particular site, it could not have been foreseen by the sanitary engineer concerned that he was dealing with a mere basin of ten acres in area instead of, as is usually the case in such supplies, a subsoil that might be free of marked obstructions for many miles. The Report shows that, except for a small space in the north-west, the ridge pierced by the outlet pipe is continuous on the north, south and east. In the north-west the sandy basin was continuous with the bed of the River Kalyani at about 1½ furlongs from the gallery; so that, on depression of the water in the ten acre basin, there resulted a flow *from* the sandy bed of the River Kalyani instead from the subsoil water on its way to the bed, and, in this manner, the main source of water supply was derived.

The moral would seem to be that in tapping subsoil waters by infiltration galleries, where pervious strata are found with grades of impervious strata, the possibility of a basin-like underground reservoir such as found in this case giving deceptive results must be held in mind; and therefore, irrespective of confidence inspired by yield of water during experimental pumping, the configuration of the supplying subsoil should be ascertained by free use of pits and boring in definite directions.

The remedies proposed are an extension of the gallery by 800 ft., so as to cut the course of the subsoil water at right angles outside the limit of the constricting clay and kunker ridge, the filling in of the ridge with puddled clay at the point cut for the outlet pipe, and the substitution of cast-iron for the cheaper but inefficient cement pipes.

In text books, there are standard diagrams of the drainage cones of subsoil waters, but it is rarely that the facts are obtainable from plotted observations. We hence invite attention to the curves as illustrated in the Report:—

Mr. Gnanaprakasam thus explains the curves:—

"The above curves show that the gallery receives its main supply of water from the west and south sides. The yield on the north side is very poor: because a sharp curve in the cone of depression generally indicates that the quantity of water drawn is greater than the rate of the yield. It will also denote therefore a poor yield or a very slow rate of flow in the subsoil water owing to increased resistance created by the compactness of the soil. Similarly, a flatness in curve along the direction of the flow of water or on upstream side indicates a proportionate increase in the flow of water or yield. But the flatness in curves on the down stream side should not be taken into consideration. These curves are generally flat on account of the fall in hydraulic gradient on the down-stream side and the yield should be usually limited."

Book Reviews.

Ryan (J. Charles). [L.R.C.P.I., L.M., L.R.C.S.I., &c). **Health Preservation in West Africa,** with introduction by Sir Ronald Ross, K.C.B., F.R.S.—xv+96 pp. with 1 plate. 1914. London: John Ball & Danielsson, Ltd. [5*s.* net.].

The author of this booklet has dedicated it to Sir Ronald Ross, who, in an Introduction, makes the following statement:—"Books like this one therefore fill a most important rôle as regards the development of tropical countries, in that they enable every one to help himself if he chooses to do so." He adds that Dr. Ryan's book "is full of wise hints and of information useful to every one."

It is rarely that books intended for the guidance of Europeans in tropical countries take note of more than therapeutic measures, supported by a few commonly recognized rules of personal hygiene. They fail to take the reader into the daily routine of life and warn him of incidents in themselves trivial, but which, if correctly interpreted, may imply the difference between a breakdown and the retention of vigorous health. In such matters, the author is eminently successful, with the result of placing a concise and useful guide at disposal. Thus, after duly insisting upon the usual preventive measures against insect-borne and vegetable parasitic diseases, he requires attention to many small but important details of personal hygiene under "camp sanitation." He insists upon all water for domestic use, including that for the bath and the washing of vegetables, being boiled. He warns as to night soil pits being in the vicinity of the water-supply, "be that a well or a river"; but, probably feeling the difficulty as to the influence of varying perviousness of different strata, he prescribes no distance.

From dwellings he would give a distance of 300 yards, and states the dimensions as 3 feet wide, 6 or more feet long, and 1½ feet deep. This he requires to be used both for receipt of the contents of pails of Europeans, and direct as a latrine by servants and other natives employed in the compound. It is obvious that this method, which is common in West Africa, is susceptible of improvement. It would be impossible for a trench of this width to be used in comfort by the natives, whilst it risks exposure to flies of an unnecessarily large area in the event of careless use of earth covering.

In his suggestion for protection against mosquitoes, he refers to a comfortable and "portable mosquito-proof room" designed by Mr. Sidney Smith. Evidently, these rooms are not much known in West Africa, but portable mosquito rooms were in use in Burma in the 'seventies. Indeed, in that country, without some such arrangement in camp during the wet season, the retention of any light would be impossible on account of swarms of uninvited insect guests. He warns against using tins filled with water in which the legs of meat safes are placed with the object of preventing attacks by ants, lest, by neglect of adding a larvicide, they become breeding places for mosquitoes. In India, this difficulty is got rid of by placing round the legs of the meat safes a small band of cotton cloth soaked in country lamp oil—crude castor oil. We have never tried the experiment of using it in these tins, but think it possible ants would not care to pass to the meat safe legs through a dry mass of powdered borax. They certainly keep clear of shelves sprinkled with borax.

The author is a believer in alcohol within restricted limits, and specially warns against the habit of "nipping," which he says "as a result of the great heat and constant thirst becomes a fascination." In this sentence, the author strikes a great truth of far reaching consequences in the tropics. It is not, in our observation, the man who takes a moderate amount (more especially if this be of definite measure) of alcohol with his meals who tends to become the victim of alcoholism in the tropics, but he who when thirsty and prostrated by heat, *between meals*, chooses to partake of fluids which he dilutes with alcohol. Most heartily do we agree with the author's strenuous warning against that sitting "out in the open" in the evening which so frequently follows the exertion of lawn-tennis in the tropics, when those concerned fail to change clothing which must be more or less

permeated with perspiration. He thus drives his warning home: "In the whole gamut of precautions there is none more sonorous than the note of warning against this practice, which, countless times, has been the exciting cause of some latent malady more or less serious." The author fails to mention or to discuss typhoid fever, presumably on the ground that this is not a disease of West Africa. If there is such immunity at present, there is no reason why it should be held to be of a permanent nature.

W. G. King.

FÜLLEBORN (F.). **Ueber eine medizinische Studienreise nach Panama, West-indien und den Vereinigten Staaten.** [On a Journey to Study Sanitation in Panama, the West Indies and the United States.] —*Beihefte z. Arch. f. Schiffs.- u. Trop.-Hyg.* 1913. Vol. 17. Beiheft 7. pp. 1-65.

In the summer of 1912 Dr. Fülleborn was commissioned by the Institute for Tropical Diseases in Hamburg to study the sanitation of the Canal Zone, and also, if time permitted, to visit the West Indies, and finally to represent his country at the International Congress of Hygiene and Demography at Washington. The expenses of this instructive journey were defrayed by the Hamburg Municipality.

The first part of the paper is concerned with a description of the local conditions prevailing in the Canal Zone. Dr. Fülleborn has much to say in appreciation of American methods, especially of the admirable discipline on duty and the feeling of good fellowship when off duty so evident amongst all ranks employed in the great work.

A large number of vital statistics and other figures bearing on the work were collected, of which a few may be quoted. The Zone, as is well-known, has been free from yellow fever since 1906, and the death rate has correspondingly fallen from 49·94 per mille in that year to 20·49 per mille in 1912. The cost of the sanitary measures adopted by Surgeon-General GORGAS works out at less than 1 per cent. of the whole expenditure on the Canal, or at about 1 cent a head for every employée. The sanitary service consists of 1,373 persons, of whom about 100 are medical men.

Pneumonia accounts for the greatest number of deaths; malaria as a cause of death has now taken a second place. Of the races employed in the Canal Zone the most susceptible to malaria hail from regions relatively free from that disease, such as the North of Italy and Spain.

The negroes exhibit a relatively high immunity to malaria and black water fever, to which Europeans of non-malarial countries employed in the Zone are especially prone; as DEEKS and JAMES have often declared, the relation between malaria and blackwater fever in Panama is an obvious one. Quinine prophylaxis finds little favour in the Isthmus, although quinine in soluble form is provided by the authorities and is to be found in every restaurant; it is generally taken by the workers as a stimulant or as an appetiser.

Anti-mosquito measures.—*Anopheles albimanus* is the chief carrier of malaria; a special study has, therefore, been made of its habits. It has been found breeding in every accumulation of water, in running streams, brackish water, bilge water and even in crab holes. An anti-mosquito campaign is conducted throughout the year and is restricted to the immediate surroundings of dwelling houses.

The responsibility for these anti-mosquito measures falls on the "Sanitary Inspection," the field of whose activity ranges over an area of 100 English square miles, containing seventeen districts in charge of as many well paid and intelligent sanitary inspectors. Each sanitary inspector has a brigade of coloured workers at his disposal.

The anti-malarial campaign is conducted under the following headings:—

(*a*) Drainage of anopheline breeding areas, wherever practicable.

(*b*) Clearing the bush and thick grass.

(*c*) Destruction of larvae by chemicals or by larvivorous fish.

(*d*) Control of the screened houses* and destruction of adult anophelines who have managed to gain entrance.

*For the value of screening as an anti-malarial measure in the Canal Zone see this *Bulletin*, Vol. 3, No. 3, p. 150.

Petroleum and a carbolized preparation known as "Larvicide" are the substances most efficient as larvicides; 67,000 gallons of raw petroleum, diluted with 5–10% of "Larvicide," at a cost of $1.1 per 42 gallons, were used during 1912.

Yellow Fever.—Since 1906 no case of yellow fever has been reported in the Canal Zone, although in spite of an energetic campaign Stegomyia is still abundant in the town of Panama, as also in the neighbouring town of Guayaquil, which constitutes an ever present menace as a reservoir of yellow fever infection.

Plague.—Rats are poisoned by phosphorus and arsenical preparations; little reliance being placed on different forms of bacterial viruses. The best results have been obtained by constantly changing the mode of laying the poison.

Pneumonia.—The ravages of pneumonia amongst the negro population are especially noticeable. In 1912 the mortality from this cause was six times greater in the coloured than in the white population.

Typhoid.—All races in the Canal Zone are proportionately liable to typhoid; the case mortality is about 14·7 per cent. Dysentery, tuberculosis, relapsing fever, yaws, ankylostomiasis, rectal bilharziasis, beriberi and pellagra are all to be reckoned with, but play little part in the mortality returns.

The report concludes with a description of the workmen's dwellings, sanitation, water-supply, and commissariat. It is interesting to note that, in pursuing their policy of thoroughness, the Americans have built and equipped the Tivoli Hotel in Ancon, where the prices are moderate and which is a profitable commercial venture. Encouraged by this experiment they are building a larger and more luxurious structure for the accommodation of winter visitors.

Dr. Fülleborn paid a visit to New Jersey where he witnessed, in the salt swamps near Elizabeth, a campaign against the New Jersey mosquito. He also found time to study the methods of the Hookworm Commission in the Southern States. After paying a flying visit to Jamaica and Havana, he returned to his duties in Hamburg at the end of October 1912.

Dr. Fülleborn is very appreciative of all he saw of American methods, and his report is worthy of serious study, crystallizing, as it does, in a short space all the available information. It is compiled throughout with the thoroughness and accuracy so characteristic of the author.

P. H. Bahr.

Schüffner (W.). **Tropenhygiene und ihre Probleme.** [Tropical Hygiene and its Problems].—Vortrag . . . in der Universitäts-Aula zu Amsterdam am 21 Januar 1913 auf Einlandung des Studenten Vereins *Secties voor Wetenschappelijken Arbeid.*—35 pp. with 1 diagram. 1913. Amsterdam: Printed by J. H. de Bussy.

An interesting account of the measures taken, under the author's superintendence, for improving the health of the native workers on a large tobacco-plantation at Deli, Sumatra, employing nearly 7,000 hands, over a period of 15 years extending from 1896 to 1911. At the commencement of this period, the mortality on the plantation averaged 74 per 1,000 per annum, with wide fluctuations according to season, so as to cause great difficulties in the supply of labour; but by the end of the period it had been brought down to 11·5 per 1,000 per annum, which the author regards as a very satisfactory result for the tropics.

The chief causes of the previously existing high mortality were found to be (1) amoebic dysentery, (2) cholera, (3) ankylostomiasis, and (4) beriberi; and these were combated in the following ways:—Dysentery was got rid of by a system of providing all the workers, while at work in the fields, with an unlimited supply of freshly-brewed tea, so that they might be under no temptation to drink cold water. This arrangement is much appreciated by the Javanese coolie, who prefers tea to water as a beverage, when he can get it without trouble to himself. Cholera and enteric fever were proved to be more due to the contamination of food by flies than to impure drinking water, and orders were therefore issued

for the consumption of all meals while hot and at regular intervals, what remained over being regularly thrown away. Messes of cold boiled rice, set aside for future consumption, form excellent media for the growth of bacteria in the tropics. This precaution was immediately followed by a great reduction in the number of outbreaks of cholera and typhoid fever. Ankylostomiasis was dealt with by the regular administration of anthelmintics to the whole corps of workers, oil of chenopodium being found the most convenient agent for the purpose; while beriberi ceded to the regular issue by the administration of supplies of rice only partially decorticated, according to the native fashion, by bruising in a mortar. The result is a great economy to the management of this large concern in the recruitment of native labour, the death-rate being less than a sixth of what it used to be.

When we proceed to ascertain which of the measures employed by the author were chiefly operative in producing so marked a reduction of mortality, it cannot be said that the evidence brought together enables them to be readily distinguished. Thus, he holds that cholera and typhoid were more fly-borne than water-borne, and that cessation of the use of cold cooked food was followed by quick reduction; whilst they admit that the water supply near habitations was subject to pollution. Unfortunately he does not state whether the system of rubbish and night soil conservancy underwent a change in the period concerned, or whether liability to pollution of waters near habitations was diminished. Again, in judging of the effects of tea drinking during labour in the fields, to which they assign the prevention of dysentery, no criterion is advanced as to the extent and nature of pollution of sources of water supply accessible at that time to the labourers. Hence, it is quite possible that the chief source of cholera, typhoid, and dysentery was not near the habitations, (and thus more immediately than in the fields connected with flies as "carriers,") but in the water supply available during work hours in the fields; and that, consequently, the institution of tea drinking (that is to say, the use of boiled instead of unboiled water) in the fields alone sufficed to check these diseases. The position is analogous to the circumstances of jails in certain parts of India, where hot cooked food protected from flies is served within the jail; but trouble is, nevertheless, liable to arise when the prisoners are worked for cultivation in its immediate surroundings, where irrigation channels and other unprotected sources of water supply may be available. In such cases, the gangs of prisoners are required to carry with them boiled or other purified water from the jails precincts, but careless supervision by guards at times results in their using contaminated water supply.

It would also have aided the gauging of the effect of the wholesale treatment of the labourers for ankylostomiasis, had it been stated whether night soil collection and disposal remains unchanged since 1897.

The absence of details such as suggested by us must, unfortunately, leave it undecided to what particular effort the results were chiefly due; but the reduction of mortality secured is none the less a solid fact, which must have been gratifying alike to the authors and to the owners of the estates—who must have profited financially by their sound advice.

W. G. K.

MENSE (Carl). **Handbuch der Tropenkrankheiten.** 2nd Edition. Vol. 2. —xv+747 pp. Imperial 8vo. With 126 illustrations in text, 14 black & white & 6 coloured plates. 1914. Leipzig: Verlag von Johann Ambrosius Barth. [Paper covers 40 mk., bound 42 mk.]

The second volume of Mense's well-known "Hand Book," which by the way is five pounds in weight, contains monographs on Applied Haematology in Tropical Diseases by Dr. V. SCHILLING-TORGAU (pp. 149), Tropical Skin Diseases by Prof. Dr. A. PLEHN (pp. 138), Worms and the Affections produced by them by Prof. Dr. A. LOOSS (pp. 202), Poisoning by Plants by Prof. Dr. F. RHO (pp. 100), Poisoning by Animals by Prof. Dr CALMETTE and Dr. L. BRUYANT (pp. 62) and Nervous and Mental Diseases in the Tropics by Dr. P. van BREEO (pp. 42). Half the text illustrations belong to Looss's article. Full bibliographies are given at the end or in

the course of each monograph. Prof. RHO's article includes pellagra. The book is well printed and very well illustrated. Detailed reviews of some of the articles will appear in later numbers.

A.G.B.

ERRATUM.

On p. 295 of No. 6 (Vol. 3) of this *Bulletin*, in a summary of a paper by De ALMEIDA, it was stated that betanaphthol was combined in a *tabloid* with phenolphthalein and that these *tabloids* were to be manufactured wholesale. In each instance the word used should have been *tablet*, or some other equivalent of the Portuguese "comprimidos," the word *tabloid* being the registered trade mark of Messrs. Burroughs Wellcome & Co.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 8.

RELAPSING FEVER.

PERTHUISOT. **Note sur la Fièvre Récurrente en Indochine et particulièrement à Thanh-Hoa en 1913.**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1914. Jan. Vol. 5. No. 1. pp. 18-31.

In this interesting article the author brings forward evidence to show that the majority of the epidemics of relapsing fever in Indochina commence during the cold season of the year and disappear during the summer. As a possible explanation it is suggested that the cold may have an effect upon the development of the spirochaete in its intermediate host. [But is it not more likely that the greater crowding together during the winter months, by increasing the risk of lice spreading from one person to another, thereby increases the chance of infection ?].

The author then calls attention to the very limited geographical distribution of the epidemics. Thus one village, Van-tap, was heavily infected whilst all round were crowds of populous towns and villages in none of which were any cases observed. The general mortality of the disease was very high before the employment of salvarsan or neosalvarsan. In 1908 the recorded mortality was 17 per cent; in 1909, 28 per cent; and in both these years the mortality was probably much higher, since cases of malaria were confused with relapsing fever. In 1911, with accurate means of diagnosis, the mortality was 69 per cent; in 1912, after salvarsan was introduced, 7·6 per cent, and in 1913 only 4·2 per cent.

The author invariably employs intravenous injections for the administration of salvarsan and, using doses of 0·15 gm., has never found it necessary to give a second injection.

With regard to prophylaxis the author advises that during the winter months the blood of all patients showing any febrile symptoms should at once be examined for spirochaetes. If infected the patient should be immediately injected with salvarsan and thus the chance of spread of infection reduced to a minimum. In addition the author always cuts off the hair of the patient and has it burnt, thus ensuring that all ectoparasites are destroyed. By applying these methods it has been found possible to arrest epidemics in several of the villages, and there is every hope of relapsing fever gradually disappearing from the country.

E. Hindle.

DUVIGNEAU. **Fièvre Récurrente au Tonkin en 1912. Epidémiologie et Prophylaxie.**—*Ann. d'Hyg. et Méd. Colon.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 849-891.

In this paper the author has collected the records of all cases of relapsing fever occurring in Tonkin during 1912. The first cases probably occurred amongst the miners in the province of Thaï-Nguyen and from this region the disease spread into the other provinces. In all, 1,761 cases were recorded with a mortality of 191; most of the cases occurred in the months February, March, April, and May.

The author also gives notes on the clinical features of the disease, without adding anything new, and particulars are furnished as to the methods of administration of salvarsan. This compound was used in the treatment of a certain number of cases with satisfactory results. The intravenous mode of administration was found to be the most convenient.

E. H.

ARMSTRONG (E. R.). **Two Cases of Relapsing Fever.** [Correspondence.] —*Indian Med. Gaz.* 1914. Feb. Vol. 49. No. 2. p. 79.

The author briefly describes two cases of relapsing fever occurring in two riflemen of the Gurkha Rifles shortly after they had returned from Eastern Nepal. Presumably the infection was acquired in this locality and, from the symptoms and the appearance of the parasites, it seems to be identical with that described by STEEN and TOWNSEND, and JUKES (see this *Bulletin*, Vol. 3, pp. 7–8 and Vol. 2, p. 369).

E. H.

BLANCHARD (M.). **Epidémie de Fièvre récurrente à Bikié (Congo français).**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 81-86.

A summary of this paper has already been published in the *Bulletin de la Société de Pathologie Exotique* (reviewed in this *Bulletin* Vol. 3, p. 4). The present article contains further notes on the epidemic and also remarks on the clinical symptoms. *Ornithodorus moubata* is said to be almost certainly the carrier of the infection, for all patients had been in infested localities. There was no evidence that lice can serve as carriers, for infected and healthy persons lived side by side and, although both were heavily infested with lice, there were no cases of the disease being transmitted in the absence of the tick. Lice collected off infected patients and injected into mice produced no infection in the latter, and therefore it seems unlikely that this insect is able to transmit *S. duttoni*.

E. H.

TRANSMISSION.

TOYODA (Hidezo). **Ueber die Entwicklung von Rekurrensspirochäten in der Kleiderlaus.** [The Development of the *recurrentis* Spirochaete in the Body-louse].—*Zeitschr. f. Hyg. u. Infektionskr.* 1913. Dec. 12. Vol. 76. No. 2. pp. 313-320. With 1 plate.

The author fed a certain number of body lice on mice heavily infected

with *S. recurrentis* and *S. novyi* respectively, and subsequently on normal monkeys. The lice were examined on each successive day in order to determine what became of the spirochaetes after they were ingested. Some of the parasites persisted unchanged in the alimentary canal for at least a week, but the majority of them degenerated very rapidly. Others penetrated through the wall of the gut and appeared in the coelomic fluid, where they have been observed from the second to the seventh day after an infective feed. In addition unchanged spirochaetes were found in the cells of the salivary glands on the seventh day, and the author considers it highly probable that the bite alone of an infected louse will be found to be infective.

The author does not find any evidence in support of the view that the spirochaetes pass through a coccoid phase in the body of the invertebrate host.

[Nicolle, Blaizot and Conseil were unable to obtain infection by the bites of lice infected with the North African strain of human spirochaetosis, although one of the subjects was bitten more than 6,000 times. It is therefore unlikely that the bite alone is able to cause infection.]

E. H.

Stefansky (V.). **Sur le Problème de l'Infection par la Fièvre Récurrente.**—*Roussky Vratch*, 1913. No. 40. p. 1386. [Reviewed in *Bull. de l'Office Intern. d'Hyg. Publique.* 1914. Feb. Vol. 6. No. 2. p. 361.]

The author has made experiments on the transmission of European relapsing fever (*S. recurrentis*) by the head-louse (*P. capitis*); his results are identical with those obtained by Nicolle, Blaizot, and Conseil (see this *Bulletin* Vol. 2, p. 143). The author, however, was unable to find any evidence of hereditary infection in the offspring of infected lice.

E. H.

Wolbach (S. B.). **The Distribution and Morphology of *Spirochaeta duttoni* and *Spirochaeta kochi* in Experimentally Infected Ticks (*Ornithodorus moubata*).**—*Jl. Med. Research.* 1914. Mar. Vol. 30. No. 1. (New Series, Vol. 25). Whole No. 143. pp. 37-48. With 3 plates.

Working with strains of human spirochaetes from East and West Africa, respectively, the author has studied the changes undergone by these organisms after ingestion by their invertebrate host, *Ornithodorus moubata*.

The study of uninfected and infected ticks supports Marchoux and Couvy's conclusions that the granules in the various epithelial structures of the tick are not connected with the life-cycles of the spirochaetes. The latter were observed to penetrate various cells of the body and also to break up into small granules, but there is no evidence of the infective nature of these and they probably represent degeneration effects.

Spirochaetes, as such, were found in the epithelial cells of the gut, and in the coxal and salivary glands, whilst in some of the connective tissue layers such as the fibro-muscular layer of the gut, the peri-

tracheal fat tissue etc. the organisms were found in such abundance as to support the view that they multiply in these situations. In addition the author observed some of the intracellular spirochaetes to form large granules (distinct from those described by LEISHMAN, BALFOUR, and HINDLE), and also coiled and encysted forms which may possibly represent resting or multiplication stages.

In any case, however, the evidence that granules and granule-clusters are a stage in the life cycle of the spirochaete is purely morphological. The spirochaetes studied, by virtue of their power of invading tissues, may be transmitted in any secretory or excretory product of infected ticks.

The author employed Giemsa's wet method for staining his preparations and found it a reliable method of demonstrating spirochaetes in the tissues of ticks. The paper is accompanied by good photomicrographs illustrating the spirochaetes in the various organs of the tick.

E. H.

GALLI-VALERIO (B.). **Recherches sur la Spirochétiase des Poules de Tunisie et sur son Agent de Transmission : *Argas persicus* Fischer. 3e Mémoire.**—*Centralbl. f. Bakt.* 1. Abt., Orig., 1914. Jan. 24. Vol. 72. No. 6/7. pp. 526-528.

The author agrees with NUTTALL that *Spirochaeta gallinarum* is identical with *S. anserina* Sacharoff and, as the latter name has priority, the term *S. gallinarum* should no longer be employed to designate the fowl spirochaete.

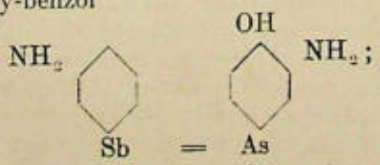
Argas persicus infected with this parasite were found to be no longer infective after 9 to 10 months, but others from Houmt-Souk (Djerba, Tunis), six months after their arrival at Lausanne, produced a mortal infection. The author adds a few notes on the biology of the tick.

E. H.

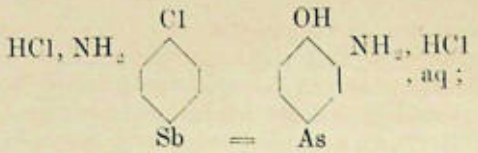
TREATMENT.

UHLENHUTH (P.) & HÜGEL (G.). **Weitere Mitteilungen über die chemotherapeutische Wirkung neuer Antimonpräparate bei Spirochäten- und Trypanosomenkrankheiten.** [Additional Notes on the Chemotherapeutical Action of New Antimony Compounds on Spirochaetoses and Trypanosomiases].—*Deut. Med. Wochenschr.* 1913. Dec. 11. Vol. 39. No. 50. pp. 2455-2457.

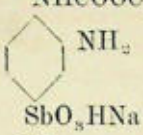
This is a continuation of the authors' previous paper (reviewed in this *Bulletin*, Vol. 1, p. 627), and contains an account of three further organic antimony compounds which have a curative action on fowl spirochaetosis. These compounds are respectively m_1 m^1-diamino-p-oxy-arseno-antimony-benzol



m_1 m^1 diamino-p-oxy-p_1-chlorarseno-antimony-benzol-dichlorhydrate,



and the sodium salt of m-amino-p-urethano-phenyl-antimonate,



In addition the first two of these compounds were found to cure mice infected with nagana and dourine. In the case of mice infected with dourine, the animals could be cured by injections of inorganic antimony compounds, such as colloidal antimony and $Sb(OH)_3$, but these substances had no effect on the course of the disease in fowl spirochaetosis.

From the authors' results it seems however that, effective as some of these new antimony compounds may be in the treatment of spirochaetal infections, they are decidedly inferior to organic mercury-compounds (see this *Bulletin*, Vol. 1, pp. 626–627).

E. H.

NEUFELD (F.) & BOECKER (E.). **Ueber die Wirkung von Salvarsan auf Hühnerspirochäten in vivo und in vitro.** [The Action of Salvarsan on Fowl Spirochaetes *in vivo* and *in vitro*.]—*Zeitschr. f. Immunitätsforsch. u. Experim. Therapie.* 1. Teil., Orig., 1914. Mar. 14. Vol. 21. No. 1/5. pp. 331-341.

The authors find that both salvarsan and neosalvarsan in very dilute concentration kill fowl spirochaetes *in vitro* as well as *in vivo*. A dilution of 1 in 3,000 salvarsan was found to kill spirochaetes, collected on the second day of infection, in three hours; whilst spirochaetes taken on the third day of the disease were killed by 24 hours' exposure to a dilution of 1 in 10,000. These results are especially interesting as at first it was supposed that salvarsan acted on the parasites indirectly through the medium of the body, but the researches of Neufeld and Böcker leave no doubt that this medicament also has a direct toxic action upon the spirochaetes.

E. H.

MOUNEYRAT, TANON & DUPONT. **Action Spirillicide du Galyl et du Ludyl.**—*Rev. de Méd. et Hyg. Tropicales.* 1913. Vol. 10. No. 4. pp. 202-204.

The authors infected eight mice with a virulent strain of *Spirochaeta duttoni* and then divided them into four lots. Two days later, when spirochaetes had appeared in the blood of all the mice, each lot was treated with one of the following substances which were administered subcutaneously in aqueous solution. After the injections the blood of each mouse was examined under the ultramicroscope in order to determine the length of time elapsing before the spirochaetes disappeared.

Lot 1 received 0·00125 gm. of salvarsan and the parasites disappeared after 16 to 20 hours; Lot 2, 0·00125 gm. of neosalvarsan and the parasites disappeared after 25 to 36 hours; Lot 3 received 0·00125 gm. of Galyl and parasites disappeared after five to eight hours, whilst Lot 4 received 0·00125 gm. of Ludyl and parasites disappeared after nine to twelve hours.

From the above results the authors conclude that both Galyl and Ludyl are better sterilising agents than either salvarsan or neosalvarsan.

Ludyl and Galyl were also found to be very effective in the treatment of syphilis, for six hours after injections of 0·5 gm. into syphilitic patients, the *Treponema* had disappeared completely from the chancres, whilst after an injection of salvarsan it is necessary to wait 15 to 24 hours for a similar result, and in the case of neosalvarsan, 24 to 36 hours.

[Although the results with Galyl and Ludyl seem to be extremely favourable, the authors' method of comparing the effects of equal doses is not quite fair. The therapeutic value of any medicament depends also on its toxicity, and therefore, in comparing any compounds, doses of equivalent toxicity should be used. Neosalvarsan, being less toxic than salvarsan, can be used in larger doses, and in this and all other cases the efficiency of a compound is better expressed by giving the ratio $\frac{\text{dosis curativa}}{\text{dosis tolerata}}$.]

E. H.

Conseil (E.). **Le Galyl et le Ludyl dans le Traitement de la Fièvre Récurrente.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 101-105. With 2 charts.

In spite of the favourable results obtained in the treatment of relapsing fever by salvarsan and especially neosalvarsan, there is generally a small percentage of cases in which relapses occur after the injection. The author therefore has employed injections of either Galyl or Ludyl, in order to determine whether these compounds were superior in their effects to the above mentioned medicaments. In all, six cases of relapsing fever were injected with Galyl and four cases with Ludyl, and the dose varied from 0·3 gm. to 0·5 gm. Twice the treatment was administered at the end of the first febrile attack, four times at the beginning and three times at the end of the first relapse; and once in the apyretic interval. Although the number of cases treated is very small, yet the author states that in every case the sterilisation of the body was obtained more rapidly than with either salvarsan or neosalvarsan, and above all more radically, for in no patient was there the slightest trace of a relapse.

E. H.

Swift (Homer F.) & Ellis (Arthur W. M.). **A Study of the Spirochaeticidal Action of the Serum of Patients treated with Salvarsan.**—*Jl. Experimental Med.* 1913. Oct. 1. Vol. 18. No. 4. pp. 435-449.

Employing *S. duttoni*, propagated in white rats or mice, the authors have investigated the spirochaeticidal action of the sera of various normal animals that had previously received injections of either sal-

varsan or neosalvarsan. The results are very interesting, for they clearly show that the sera of such injected animals has a definitely toxic effect upon *S. duttoni*.

The method of investigation was as follows:—A suspension of spirochaetes for performing a test was obtained by bleeding a heavily infected mouse or rat into normal saline, and then diluting the blood until it contained a definite number of spirochaetes in each microscopic field. One cubic centimetre of this suspension was mixed with one cc. of the serum, or dilution of serum, to be employed and the resulting mixture incubated at 37° C. for one hour. Half of it was then injected into a mouse while at the same time control mice were injected with an equal quantity of untreated spirochaetes, or spirochaetes mixed with normal serum.

When a rabbit received an intravenous injection of neosalvarsan its serum was found to possess spirochaeticidal properties, which were most marked in the serum taken immediately after the injection and had nearly disappeared at the end of about six and a half hours. Similar results were obtained by employing the sera of human patients that had received injections of salvarsan and neosalvarsan respectively, and from the experiments it seems that the serum of patients treated with neosalvarsan exercises a slightly more spirochaeticidal action than that of patients treated with salvarsan. This difference can also be detected by applying the Abelin diazo reaction for salvarsan to the two sera.

The spirochaeticidal action of the sera of rabbits and patients treated with salvarsan (and neosalvarsan) is markedly increased by heating at 56° C. for thirty minutes. The increased action of such heated sera may be due in part to the destruction of some inhibitory substance contained in normal serum, and in part to a direct effect of the heat upon the serum and salvarsan mixture.

Cerebrospinal fluid does not contain the inhibitory substance present in normal unheated serum and the authors have shown* that the subdural injection of the serum of salvarsan-treated patients has a definite curative action in syphilitic disease of the central nervous system.

E. H.

Laboratory.

Gonder (Richard). **Experimentelle Studien über** *Spironema gallinarum* **und** *Spironema recurrentis*. [Experimental Studies on *Spironema gallinarum* and *Spironema recurrentis*.]—*Zeitschr. f. Immunitäts-forsch. u. Experim. Therapie.* 1. Teil. Orig. 1914. Mar. 14. Vol 21. No. 1/5. pp. 309-325.

The author has investigated the question of arsenic resistance in the case of the fowl spirochaete and also *S. duttoni*. (The term *Spironema recurrentis* is employed for the latter.) The strains employed were resistant against salvarsan, and it was found that this resistance was maintained after the parasites had been passed through a number of animals. In addition the natural carriers of these two infections,

* *New York Med. Jl.* 1912. Vol. 96. p. 53.

respectively *Argas persicus* and *Ornithodorus moubata*, were fed on animals infected with the resistant strains and subsequently on normal fowls and mice. The latter became infected respectively with *S. gallinarum* and *S. duttoni*, and it was found that these spirochaetes were still resistant to the drug, although they had passed through the invertebrate host. [It will be remembered that when arsenic-resistant *Trypanosoma lewisi* is transmitted by its invertebrate host, *Haematopinus spinulosus*, the trypanosomes lose their resistance.]

In addition, the author has worked on the immunity following an attack of fowl spirochaetosis. The immunity following an attack of the Sudan strain of fowl spirochaetosis protects a bird against infection with the Brazilian strain, whilst a fowl that has recovered from an attack of the latter can still be infected by injecting it with the Sudan strain.

Finally, a few experiments were performed on the result of passing the fowl spirochaetes through the Java sparrow and subsequently back into fowls, and *vice versa*. The results are very interesting, for a fowl that is immune against a particular strain of spirochaetes can be reinfected if this same strain is first injected into a Java sparrow and then back into the fowl. Similarly a Java sparrow that has recovered from an attack of spirochaetosis is immune against reinfection with the same strain, if the latter is being kept in Java sparrows, but is susceptible to the strain if it has been passed through fowls.

Both fowls and Java sparrows, if they have recovered from two such infections, are immune against reinoculation from either of these birds.

[The number of experiments on which Gonder bases his conclusions is very small—usually only one or two—and considering that the immunity following an attack of fowl spirochaetosis is sometimes incomplete, some of these results require confirmation.]

E. H.

Todd (J. L.) & Wolbach (S. B.). **Concerning the Filterability of *Spirochaeta duttoni*.**—*Jl. Med. Research.* 1914. Mar. Vol. 30. No. 1. pp. 27-36.

In this interesting article the authors describe their attempts to filter *Spirochaeta duttoni* through Berkefeld filters, first at atmospheric pressure and later under pressures of fifty pounds to the square inch. Experiments were conducted with four strains of the spirochaete, one from the Congo, another from East Africa and the other two from Central and South Central Africa, respectively. In every case rats were used, and as soon as one was heavily infected it was killed and the blood and organs removed and ground up together in a mortar, with a one per cent. solution of sodium citrate in normal saline. This mixture was then drawn off and filtered two or three times through a Buchner filter. A part of the liquid was then inoculated into a control rat which invariably became infected, whilst the remainder was mixed with some bacillus and filtered through a No. 9 Berkefeld filter either N, W or V.

In addition ticks from various localities, kept either at ordinary temperatures or at 35° C, were ground up in saline and filtered in the same way and also eggs laid by infected ticks were similarly treated.

The results show that *Spirochaeta duttoni* in an infective form cannot be filtered through a Berkefeld filter at atmospheric pressure. On the other hand when the pressure was increased to 50 pounds per square inch an infective form of the spirochaete was forced through the filter, and eight out of eleven animals inoculated with the filtrate became infected.

As the authors remark, there is certainly room for an inquiry into the form in which the spirochaete passes through the filter.

E. H.

Launoy (L.) & Lévy-Bruhl (M.). **Evolution de la Spirillose chez la Poule, après Splénectome.**—*Compt. Rend. Soc. Biol.* 1914. Feb. 27. Vol. 76. No. 7. pp. 298-299.

The authors have splenectomised a number of fowls in order to study the effect of the spleen on the course of the disease in the case of *S. gallinarum*.

The results shew that the evolution of the disease in splenectomised fowls differs slightly from that in normal fowls; in the former the spirochaetes persist in the circulation for a longer period and the infection is more intense; on the other hand the clinical symptoms, and especially the state of intoxication of the animal, are less pronounced.

[The supposed protective rôle of the spleen in the case of protozoal and spirochaetal infections is largely based on the presence of splenomegaly in these diseases. Experiments with *S. recurrentis* and *S. duttoni* tend to support this theory, for in the absence of the spleen the infection is usually more intense than in normal animals. The differences, however, are rarely very marked.]

E. H.

Neiva (Arthur). **Modo de Comportar-se do *Treponema gallinarum* em Temperaturas baixas.** (Nota prévia.) [The Behaviour of *Treponema gallinarum* at Low Temperatures.]—*Brazil Medico.* 1914. Jan. 1. Vol. 28. No. 1. pp. 1-2.

The author has kept fowl spirochaetes at zero for 49 days, and finds that they still maintain their virulence. In addition he has obtained evidence that the spirochaetes multiply in the extra-vascular blood.

E. H.

Wolbach (S. B.) & Binger (C. A. L.). **The Cultivation of a Free-Living Filterable Spirochete (*Spirochaeta elusa*; new species). A Preliminary Report.**—*Jl. Med. Research.* 1914. Mar. Vol. 30. No. 1. (New Ser. Vol. 25). Whole No. 145. pp. 9-22. With 3 plates.

A description of a most interesting spirochaete that developed from the filtrate of water collected from a pond in Boston, U.S.A., and filtered through a Berkefeld "V 2" filter. This organism closely resembles some of the pathogenic spirochaetes, but is peculiar from the fact that it is possible to grow it on solid media (hay infusion agar), when it forms definite colonies similar in appearance to those formed

by ordinary bacteria. In addition, the spirochaete can be cultured with ease in ordinary hay infusion.

[Those interested should consult the original article.]

E. H

MEIROWSKY (E.). **Protozoischer oder pflanzlicher Entwicklungskreis der Spirochäten?** [Is the Development of Spirochaetes Protozoal or Plant-like?]—*Dermatol. Wochenschr.* 1914. Feb. 21. Vol. 58. No. 8. pp. 225-232. With 1 plate.

The author compares corresponding stages in the development and life-cycles of the following organisms:—Tubercle bacillus, leprabacillus, *Spirillum rubrum*, *Spirochaeta gallinarum*, and *Spirochaeta* (=*Treponema*) *pallida*, both from cases of syphilis and also from cultures. Especial attention is devoted to the arrangement of tha chromatic substance and also to the formation of coccoid bodies in the various organisms. After summing up, the author concludes that there is overwhelming evidence in support of the view that the spirochaetes are vegetable and not animal parasites.

[Throughout the whole of his paper Meirowsky does not refer to the work of any English or French investigators with the exception of MCDONAGH and LEVADITI. Some of his figures of *S. gallinarum* are taken, without any acknowledgement, from HINDLE'S article "On the Life-Cycle of *Spirochaeta gallinarum*."*]

E. H.

MEIROWSKY. **Untersuchungen über die Stellung der Spirochäten im System.** [Researches on the Systematic Position of Spirochaetes.]—*Münchener Med. Wochenschr.* 1914. Mar. 17. Vol. 61. No. 11. pp. 592-596. With 1 plate and 1 text-fig.

The author gives an incomplete resumé of the literature and reasserts the now generally accepted view that spirochaetes belong to the bacteria and not to the protozoa. The only thing new in the article is a description of the occurrence of branched forms of spirochaetes in cultures of *T. pallidum*, *S. gallinarum* and other forms. This most interesting observation is a further support of the bacterial nature of these organisms.



Branched form of *Spirillum rubrum* from a 16-day-old bouillon culture.

E. H.

* *Parasitology* 1911. Vol. 4. pp. 463-477.

SLEEPING SICKNESS.

MESNIL (F.) & BLANCHARD (M.). **Sur l'Identification du Virus d'un Cas de Trypanosomiase humaine contractée au Laboratoire. Note Préliminaire.**—*Bull. Soc. Path. Exot.* 1914. Mar. Vol. 7. No. 3. pp. 196-200.

In May 1912 Professor LANFRANCHI of the Veterinary School at Parma was found to be infected with trypanosomiasis (see this *Bulletin*, Vol. 1, p. 506). The only strains of trypanosomes kept at Parma were those of Nagana and Surra. LANFRANCHI was convinced that the strain with which he was infected was that maintained in his laboratory in May 1912. This strain was sent to the authors and in the present paper is designated "Parme A" [A, animal]. Three weeks later LANFRANCHI visited Paris and numerous trypanosomes were found in his blood. Animals were inoculated with his blood and strain "Parme H" [H, human] was obtained. The present paper deals with the identification of the two strains.

Against the virus "Parme H" the serum of the patient, of guinea-pigs and of goats infected with "Parme H," and the serum of man, goats and a pig infected with *T. gambiense* manifested in general a protective action. The action of the serum from a case of sleeping sickness from the Congo was extremely definite, whilst normal human serum was without effect. The sera of guinea-pigs infected with "Parme A" and of goats infected with nagana or surra were without action on the virus "Parme H"; the sera of these goats had also been shown to be without effect on *T. gambiense*. On the other hand the serum of guinea-pigs infected with "Parme A" had almost always exhibited a certain action on *T. gambiense*. This is anomalous, for according to all the other reactions "Parme A" is quite distinct from *T. gambiense*; the protective action of various sera show it to be allied to Surra. The serum of a surra goat acted on "Parme A" and conversely the serum of a "Parme A" guinea-pig was as active against surra as against "Parme A." These reactions therefore indicate that Parme H=*T. gambiense* and Parme A=*T. evansi*; there is no support for the view that Parme A is nagana or *T. togolense*.

Two goats, A and B, were inoculated with *T. gambiense* and a third, C, with "Parme H." All these contracted identical infections lasting about three months. On recovery they were found to be immune to the virus with which each was infected. The following cross inoculations were then made. Goat A was inoculated with "Parme H," there was no febrile reaction and its blood 8 days later did not infect mice. Tested finally to *T. gambiense* it was still immune. Goat B was also inoculated with "Parme H," there was no febrile reaction but its blood 7 days later infected mice; 17 days later mice did not become infected. A second inoculation of "Parme H" was made in goat B two months after the first, there was no febrile disturbance but merely a certain persistence of the parasites; a mouse inoculated with its blood 14 days later became infected after a prolonged incubation period. A final reinoculation of this goat with *T. gambiense* gave a like result. Goat C was inoculated with *T. gambiense*. There followed a febrile disturbance which did not however reach 40° C. The blood of the goat infected mice on the 7th day after inoculation but not on the 17th day.

There was hence complete immunity in the case of goat A and incomplete immunity in the case of goats B and C, but there is no indication of any difference which would permit of distinguishing between "Parme H" and *T. gambiense*.

A goat, immune to surra, was inoculated with Parme A; there was neither febrile disturbance nor infection, a fact which supports the view that the two are identical. The goat was then inoculated with "Parme H"; it contracted an infection lasting 5 months, that is longer than that of the clean goat C.

"Parme A" and "Parme H" behave then as specifically distinct parasites.

It was found that the serum of the patient in question was trypanolytic and "attaching" in a special manner for *T. evansi* even though it did not act on the virus Parme A. The serum of three sleeping sickness patients from the Congo were trypanolytic for *T. gambiense* but only agglutinated Parme H.

Referring to the morphology of the trypanosome infecting LANFRANCHI, the authors insist on the following points:—Firstly the relatively large number of parasites in the peripheral blood, secondly the susceptibility of the guinea-pig and especially the mouse to direct inoculation of the blood of the patient, thirdly the remarkable monomorphism of the trypanosome in the blood of the patient and the earlier passages in the mouse and guinea-pig.

The authors conclude that the virus "Parme H" does not differ from *T. gambiense* and Parme A from *T. evansi*. These two parasites are hence different, or one must assume a transformation of species, which is not in accord with our knowledge of pathogenic trypanosomes. Other observations suggest some doubt as to the absolute identity of the virus "Parme H" with *T. gambiense*. Temporarily the authors will associate with this virus the term *Lanfranchii* without attaching any specific signification to it.*

W. Yorke.

KERR (T. S.). **A Human Recovery from Trypanosomiasis.**—*Jl. Trop. Med. & Hyg.* 1914. Mar. 16. Vol. 17. No. 6. pp. 81-83. With 2 charts.

This paper gives the clinical history of a Mrs. G., who contracted sleeping sickness in Portuguese Loanda in June 1909. The author writes that the points of interest in the case are:—

"(1) The high eosinophile count, not usual in trypanosomiasis, though helminths were absent.

"(2) The extraordinary good health enjoyed by the patient in spite of the persistence of the infection. On June 16, 1911, two years after the initial infection, she was playing tennis daily. This was, I think, attributable to the tonic effect of the soamin.

"(3) The large amount of antimony taken internally.

"(4) The curative effect of the intravenous injections of tartar emetic.

*Professor LANFRANCHI states that the only strain in his laboratory was that which was sent to Paris, which appears to be *T. evansi*. No human strain existed at Parma, yet the trypanosome infecting him turns out to be distinguishable with difficulty, or not at all, from *T. gambiense*. It is certainly hard to reconcile the laboratory findings with LANFRANCHI'S statement. Light might be obtained if we had the history of the trypanosome strains maintained at Parma.—A.G.B

"(5) Whether the course of soamin injections and antimony by the mouth during eighteen months rendered more effective the subsequent intravenous injections of antimony is a matter for conjecture: unquestionably they did her much good, but there can I think be little doubt that the intravenous injections were the active remedial agent and caused the disappearance of the trypanosomes.

"(6) Symptoms having now been absent for so long point, I think, to a real recovery from the disease and not merely to an arrest of its progress."

W. Y.

Annales d'Hygiène et de Médecine Coloniales. 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 262-264. **Un Cas de Trypanosomiase contractée au Congo, observé à Nouméa (Nouvelle Calédonie). Violentes Réactions à la Suite d'Injections intraveineuses d'Emétique. Extrait du Rapport annuel de la Direction du Service de Santé du Groupe du Pacifique.** [Clinique d'Outre-Mer.]

This paper describes the clinical manifestations noted in a case of sleeping sickness contracted in the Congo. Trypanosomes were found in the cerebrospinal fluid in June 1911, and ·75 gm. of atoxyl was administered. The symptoms disappeared and the patient left hospital in July; he returned however at the beginning of November, in spite of the fact that treatment had been continued the whole time. At the end of November an intravenous injection of ·07 gm. of emetic was given. About an hour and a half later there was great vomiting and diarrhoea accompanied by syncope and tremors; the pulse was 112; the attack subsided after about two hours.

Similar attacks followed subsequent injections of emetic. Later, symptoms indicating involvement of the central nervous system developed, the patient became comatose and died at the end of June 1912.

W. Y.

Inman (W. S.). **Case of Irido-cyclitis occurring as an early Symptom of Trypanosomiasis** (*Trypanosoma gambiense*).—*Proc. Roy. Soc. Med.* 1914. Mar. Vol. 7. No. 5. Sect. of Ophthalmology. pp. 72-73.

The patient was a European who had recently returned from Northern Nigeria. At the time of landing there was slight puffiness of the eyelids and a little inflammation of both eyes. A lotion and quinine were prescribed with the result that the inflammation subsided but some blurring of the left eye persisted. A fortnight later there was a relapse of the inflammation with increased blurring.

The following description of the condition found is given:—

"R.V.= $\frac{6}{6}$, there was no K.P.; the fundus was normal, and the pupil dilated fully with homatropine. L.V.= $\frac{6}{9}$ slowly; there was much fine K.P., no vitreous opacity, and no fundus change visible. He gave a history of slight malaria, but there was no history of dysentery nor of venereal disease, and subsequent inquiry showed that there was no inherited syphilis. On January 14 he had two teeth removed from the upper jaw, but no pyorrhoea was found. On the morning of January 16 he noticed a blur in front of his right eye, and, on examination, many dots of K.P. were found to be present. The iris was of good colour and the pupil reacted well, and the vision was still $\frac{6}{9}$. On January 23 the right eye was a little better. On January 29 the left eye became a little painful, and on January 30 there was more K.P. but very little redness, and no photophobia. Above the lower nasal vessels, a small distance from the disk, there was a small white spot in the fundus the nature of which was doubtful."

On examination of the blood *T. gambiense* was found.

W. Y.

TREATMENT.

LAFONT (A.) & DUPONT (V.). **Traitement de la Trypanosomiase humaine au Sénégal par le Ludyl et le Galyl.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 160-171.

The results are recorded of treating cases of sleeping sickness with ludyl and galyl (see this *Bulletin*, Vol. 2, p. 353). All the patients (4 girls, 5 boys, 8 women and 19 men) were natives. The drugs were administered intravenously. Most of the patients exhibited auto-agglutination of the red cells before treatment, which was commenced as soon as trypanosomes were found. The cervical glands were generally enlarged, and about 75 per cent. of the cases presented the characteristic facies, apathy with a tendency to mutism, and sometimes sleep. In some instances there were tics and hyperaesthesia, rendering treatment difficult and lumbar puncture impossible.

Details of the cases and treatment are given. Albuminuria was noted in about 80 per cent. of the patients, but its presence is no contra-indication for intravenous injections, in fact the symptom is often relieved by treatment. As a measure of prudence frequent analyses of the urine were made to regulate the increasing and spacing of the doses.

As regards the co-existence of other diseases, filariasis, malaria, bilharziasis, various cutaneous eruptions and syphilis were encountered. Ludyl and galyl are without definite action on microfilaria; their action on syphilis is well known, but on malaria the doses given appeared to have no action.

Changes in the myocardium and pericarditis are the only serious contra-indications to intravenous injection of the drugs. The temperature, before and after injection, is a valuable indication; too prolonged an elevation of temperature should make one very circumspect in pushing the treatment.

Twenty-one of the patients treated came from Senegal. They came of their own free will, and on arrival were frequently found to be badly nourished and in a very unfavourable condition for treatment. They had diagnosed themselves as suffering from sleeping sickness, and of 23 who declared themselves infected only two were discharged as uninfected.

All the patients received benefit from the treatment. Transient amelioration of the symptoms was observed with small doses of the drug or when the treatment was insufficiently prolonged. Permanent amelioration was obtained with doses of 5 to 10 cgm. per kilo of body weight. The enlarged lymphatic glands disappeared as also did all other symptoms. Intraperitoneal injections of patas monkeys with 60 to 90 cc. of the blood of patients 30 to 40 days after treatment were negative.

The injections were made intravenously, the drugs being dissolved in water containing sodium carbonate in solution (see this *Bulletin*, Vol. 2, p. 353). The complications following injection are trifling, consisting only of an occasional slight rise of temperature. Escape of the fluid into the perivascular tissue causes pain and subsequently induration, which however disappears without complication.

On injection of ludyl the patient only experiences a sensation of cold, but with galyl he breathes noisily and perceives an odour like that of a struck match.

The results obtained by treatment with ludyl or galyl or a combination of the two are very encouraging, although it would as yet be premature to pronounce definitely on their value.

W. Y.

V. D. Hellen. **Versuche zur Behandlung von Schlafkranken mit Trixidin.** [On the Treatment of Sleeping Sickness by Trixidin.]—*Deut. Med. Wochenschr.* 1914. Feb. 19. Vol. 40. No. 8. pp. 388-390.

Arsenophenylglycin, salvarsan and neosalvarsan have proved so successful in the treatment of early cases of sleeping sickness in Togo that there is no necessity to try other remedies in these cases. However, even when the nervous system is but slightly involved, the prognosis is doubtful, whilst in those cases exhibiting marked nervous symptoms the prognosis is very unfavourable.

The author decided to try the effectof Trixidin, (30 per cent. suspension of antimony trioxide in oil. See this *Bulletin*, Vol. 2, pp. 134 and 351, and Vol. 3, p. 247). The remedy was used in ten cases, seven of which had relapsed after arsenic treatment and three others previously untreated. Details of the treatment and results of examination of these ten cases are given. Of 28 injections (·2 to ·8 cc.) 24 gave rise to abscesses necessitating surgical treatment. The quantity of the drug absorbed in such cases is naturally unknown. Albuminuria was observed in one of the cases after treatment and, as no other cause for its appearance than the drug could be found, the author writes that in this instance an injurious quantity of the drug had been absorbed without destroying the trypanosomes. Two other cases showed that considerable quantities of the drug may be retained in the body without any curative effect. In one case after Trixidin treatment the glands in the neck became smaller, but no definite conclusion can be reached, as the period of observation is yet too small. The author is of opinion that Trixidin is not to be recommended for the treatment of sleeping sickness.

W. Y.

Lurz (R.). **Versuche mit dem Trypanosomenheilmittel "Trixidin" bei schlafkranken Menschen.** [Experiments with Trixidin in Sleeping Sickness.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Mar. Vol. 18. No. 6. pp. 212-213.

Seven cases of sleeping sickness, which apart from glandular enlargement exhibited no signs of disease, were treated with Trixidin. Each patient, except one who ran away after the first injection, received two doses of the drug—one into each buttock—two days elapsing between the injections. The amount of Trixidin given in one injection varied from ·1 gm. to ·3 gm. The injections were painful and, owing to the thickness of the suspension, difficult to administer. They were followed by severe abscesses, fever, great pain, and loss of sleep and appetite.

Nine days after the first injection the abscesses were opened. It was found that they had burrowed deep among the muscles and that they contained much pus and unabsorbed Trixidin. The abscesses healed slowly and in one case healing was delayed through necrosis of a portion of the left gluteal muscles.

No benefit was obtained from the treatment; the glands did not decrease in size; in a single case only did the trypanosomes disappear from the blood and gland juice; in this patient the parasites were found in the cerebrospinal fluid.

As a result of this work the author considers Trixidin to be valueless in the treatment of human trypanosomiasis.

W. Y.

WERNER (H.). **Trypasafrol und Trixidin bei menschlicher Trypanosomiasis.** [Trypasafrol and Trixidin in Human Trypanosomiasis.] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. April. Vol. 18. No. 7. pp. 246-248.

Two sleeping sickness patients were treated with Trypasafrol; doses up to ·39 gm. were given daily by the mouth. Although a certain trypanocidal effect was noticed in one of the cases, the treatment did not cause the trypanosomes to disappear permanently from the blood.

Two other cases of sleeping sickness were treated with Trixidin. The author is unable to record any definite specific action on the infection either by the inunction method of treatment, which was borne well, or by intramuscular injection, which on account of the pain caused soon had to be discontinued.

W. Y.

DANYSZ (J.). **Traitement du Surra par les Composés arsénicaux et Arséno-argentiques. Rapports entre les Doses tolérées et les Doses curatives.**—*Bull. Soc. Path. Exot.* 1914. Mar. Vol. 7. No. 3. pp. 200-202.

The author has worked out the lethal and curative doses of various arsenical compounds for mice infected with surra. The strain came from MESNIL'S laboratory. He obtained the following results: Atoxyl, largest dose tolerated 4 to 5 mgm., curative dose 3 mgm., ratio 1 to 1; Arsenophenylglycin, largest dose tolerated 1 cgm., curative dose 3 mgm., ratio 3 : 1; chlorhydrate of dioxy-diamino-arsenobenzol (606), largest dose tolerated 2·5 mgm., curative dose ·3 mgm., ratio 8 : 1; sulphate of dioxy-diamino-arseno-benzolate bromoargentic (88"), largest dose tolerated 2·5 mgm., curative dose ·07 mgm., ratio 35 : 1.

The author has found that the product "88" can be injected on several occasions without any inconvenience. It follows that for surra the arsenobromoargentic product is 4 times more active than "606," 10 times more active than arsenophenylglycin and 35 times more active than atoxyl.

W. Y.

TABLE GIVING THE SALIENT CHARACTERS OF THE MORE IMPORTANT MAMMALIAN TRYPANOSOMES

Group	Sub-Group		Trypansome	Date and designators	Synonyms	Motility	Morphology						Pathogenicity	Development in insect host when known	Where first found	Remarks
							Qualitative Characters				Quantitative Characters					
							Flagellum	Blepharoplast	Nucleus	Cytoplasm	Length in microns	Breadth in microns				
											Min. Max.	Min. Max.				
I	A	1	*T. brucei*	1899 Plimmer & Bradford	....	....	Always free	....	....	....	18 34	..	Acute for all laboratory animals	Unknown	Zululand	
		2	*T. evansi*	1885 Steel	*T. soudanense* (1907) *T. venezuelense* (1910)	....	,,	....	....	....	18 34	1·5 2	,, ,, ,,	,,	India	
		3	*T. hippicum*	1910 Darling	....	....	,,	....	....	....	18 28	1·5 3	,, ,, ,,	,,	Central America	
	B	4	*T. equiperdum*	1901 Doflein	....	....	,,	....	....	....	16 35	..	,, ,, ,,	Transmitted by coitus	North Africa	Causes characteristic 'plaques'
	C	5	*T. equinum*	1901 Voges	....	....	,,	Absent	....	....	Average 23	1·5	,, ,, ,,	Unknown	South America	
	D	6	*T. vivax*	1905 Ziemann	*T. cazalboui* (1906)	Very rapid, translatory	,,	....	....	Club-shaped	16 31	2 3	Equidae and ruminants only	Limited to the proboscis in glossina	Cameroon	
		7	*T. caprae*	1910 Kleine	....	,, ,,	,,	....	....	Heavier build than *vivax*	18 32	1·75 4·25	,, ,,	,, ,, ,,	German East Africa	
		8	*T. uniforme*	1911 Bruce	....	....	,,	....	....	....	12 19	1·5 2·5	,, ,,	,, ,, ,,	Uganda	
	E	9	*T. transvaaliense*	1903 Laveran	....	....	,,	Near nucleus	....	....	18 50	4 6	Slight to bovidae only	Unknown	Transvaal	
		10	*T. theileri*	1902 Laveran	....	....	,,	....	....	....	25 70	2 5	,, ,,	Possibly hippobosca, details unknown	Transvaal	
	F	11	*T. ingens*	1909 Bruce	....	....	,,	Near nucleus	....	*Myonemes*	72 122	7 10	Unknown	Unknown	Uganda	
		12	*T. tragelaphi*	1913 Kinghorn & Yorke	....	....	,,	Near nucleus	....	,,	52 72	5 8·5	,,	,,	N.E. Rhodesia	
	G	13	*T. lewisi*	1881 Kent	....	Very rapid, translatory	,,	Rod shaped, transverse	Junction of ant. and middle thirds	....	Average 24	..	Rats only infected	Intestines of rat fleas and lice	(World wide)	
	H	14	*T. cruzi*	1909 Chagas	....	Tumbling movement	,,	Large ovoid	....	....	Average 20	..	Slight for laboratory animals	....	Brazil	Dividing forms not seen in blood?
II	I	15	*T. congolense*	1904 Broden	*T. dimorphon* (1904) *T. pecorum* (1910) *T. confusum* (1909)	....	Never free	....	....	....	8 19	Average 1·5	Acute for all laboratory animals	Gut and proboscis of glossina	Congo	Probably these trypanosomes are identical
		16	*T. nanum*	1905 Laveran	....	....	,,	....	....	....	10 16	Average 1·5	Equidae and ruminants only?	,, ,,	Soudan	
	J	17	*T. montgomeryi*	1909 Laveran	....	....	,,	....	....	Heavier build than *congolense*	10 20	Average 3·3	Slight for laboratory animals	Unknown	N.E. Rhodesia	
	K	18	*T. simiae*	1912 Bruce	*T. ignotum* (1912)	....	,,	Frequently projects as lateral exercescence	....	....	12 23	..	Acute for monkeys and pigs only	Proboscis of *Glossina morsitans*	Nyasaland	
III	L	19	*T. gambiense*	1902 Dutton	....	....	Sometimes free and sometimes not	....	....	....	13 39	..	Acute for laboratory animals	Gut and salivary glands of glossina	Gambia	
		20	*T. multiforme*	1912 Kinghorn & Yorke	....	....	,,	....	....	....	10 33	..	Slight for laboratory animals	Unknown	N.E. Rhodesia	
		21	*T. nigeriense*	1913 Macfie	....	....	,,	....	....	....	8 37	..	,, ,,	,,	Nigeria	
		22	*T. pecaudi*	1907 Laveran	....	....	.	....	Posterior nuclear forms	....	14 35	..	Acute for laboratory animals	Gut and proboscis of glossina *	Senegal	* Roubaud & Bouet's observation
	M	23	*T. rhodesiense*	1910 Stephens & Fantham	....	....	,,	....	,,	....	12 39	..	,, ,,	Gut and salivary glands of glossina	N.E. Rhodesia	
		24	*T. ugandae*	1913 Stephens & Blacklock	*T. brucei* (Uganda) (1909)	....	,,	....	,,	....	13 38	..	,, ,,	,, ,, ,,	Uganda	
		25	*T. equi*	1913 Blacklock & Yorke	....	....	,,	....	.	....	14 36	..	,, ,,	Transmitted by coitus	North Africa	

Moldovan (J.). **Ueber die Wirkungsart des Atoxyls, Salvarsans und des Menschenserums bei der experimentellen Naganainfektion.**—[The manner in which Atoxyl, Salvarsan and Human Serum act in experimental Nagana infections.]—*Zeitschr. f. Immunitätsforsch. u. Experim. Therapie.* 1. Teil. Orig. 1914. Mar. 14. Vol. 21. No. 1/5. pp. 481-519.

The experiments described in this paper show that the action of atoxyl in nagana infections is direct; the drug acts as such on the trypanosomes. The active principle is not formed through any change due to the body cells, nor is it the excitation of phagocytosis or other protective properties of the body which leads to the destruction of the parasites. The atoxyl is taken up unchanged by the trypanosomes and in their own body they themselves form the destructive poison. The inactivity of the drug in vitro has its explanation in the fact that the animal organism is only so far necessary as it renders multiplication of the parasites possible. This stipulates an increase in the metabolism of the parasites and qualifies them to take up substances and convert them into poisons, which in vitro are indifferent on account of the slight capacity of the parasites for absorbing them. The mechanism of the action of atoxyl may be divided into three phases: the absorption of the drug by the trypanosomes, its reduction in the parasite body, and the action of the toxic reduction product on the trypanosome cell. Atoxyl resistance is not due to a non-absorption of the drug, nor to a failure to reduce it, but to an insusceptibility of the trypanosome cell to the poisonous action of the reduction products.

The parasitotropism is not alone dependent on the nature of the drug nor on its degree of organotropy, it is also really a function of the vitality of the trypanosome itself. It varies under otherwise similar conditions, according to the stage of the infection and to the intensity of the multiplication of the parasites.

Similarly the action of salvarsan, both in trypanosome and spirochaete infections, is directly on the parasites, and its inactivity in vitro may be explained in the same way as in the case of atoxyl.

Human serum acts in experimental nagana infections in the same direct manner. Here also the serum constituent, which in vitro is inactive, is absorbed and in a degree comparable with the metabolic intensity of the parasites changed into an active poison; this appears to be due to reduction as in the case of atoxyl.

The demonstration of an identical manner of action of principles so different justifies the view that the remaining "indirectly" acting substances behave in a similar manner.

W. Y.

Uhlenhuth (Paul) & Seyderhelm (Richard). **Experimentelle Untersuchungen über den Einfluss elektrischer Schwachströme auf Trypanosomen in vitro und in vivo.** [Experimental Studies on the Influence of Weak (or low-tension) Electric Currents on Trypanosomes *in vitro* and *in vivo*.]—*Zeitschr. f. Immunitätsforsch. u. Experim. Therapie.* 1. Teil. Orig. 1914. Mar. 14. Vol. 21. No. 1/5. pp. 366-377.

Besides chemotherapeutic work there have been during the last ten

years repeated efforts to destroy trypanosomes both in vitro and in vivo by purely physical means. A brief resumé of the literature dealing with this subject is given by the authors.

The experiments described in this paper deal with the effects of the electric current on trypanosomes both in vitro and in vivo. It was found that *T. equiperdum* and *T. lewisi* were killed in vitro by a weak electric current (10–15 milliampère) in from 15–50 minutes. On a stage of great activity follows slowing of the movements and death. *T. equiperdum* proved to be more susceptible to the effects of the electric current than *T. lewisi*. By subjecting trypanosomes to non-lethal doses of weak electric current it was found possible to destroy their infectivity. Electrolytically disintegrated trypanosomes (*T. equiperdum* and *T. lewisi*) proved to be toxic for mice. The trypanosome poison prepared in this way appeared to be pre-eminently a nerve toxin.

Under certain experimental conditions it was found possible to kill trypanosomes in vivo by means of weak electric currents.

W. Y.

HALBERSTAEDTER (L.). **Experimentelle Untersuchungen an Trypanosomen über die biologische Strahlenwirkung.** [Experimental Investigations on the Action of various Rays on Trypanosomes.] —*Berlin. Klin. Wochenschr.* 1914. Feb. 9. Vol. 51. No. 6. pp. 252-253.

There already exist a number of observations on the effect of rays on trypanosomes, but the results are somewhat contradictory; thus SALOMONSEN and DREYER found that radium emanations had a strong action on trypanosomes, LAVERAN and MESNIL observed but little effect, whilst LÖWENTHAL and RUTKOWSKY found hardly any. All these authors regarded the motility of the trypanosomes as the criterion of the effect of the rays. This, however, is unsatisfactory, because the motility of trypanosomes outside the body usually quickly decreases; moreover chemotherapeutic experiments have shown that the motility and power of reproduction are not necessarily parallel; the parasites may still preserve their motility and yet have lost their capacity of multiplying in the animal body.

The author noted that trypanosomes which had been subjected to the emanations of radio-active substances (radium, mesothorium, thorium x) remained actively motile long after they had lost the power of infecting experimental animals. The hitherto published results of the influence of radio-active substances on trypanosomes must therefore be revised—the same holds true of Röntgen rays and light rays. For many reasons trypanosomes are most suitable objects for biological experiments with various kinds of emanations. Details of the technique adopted by the author are given; the parasite employed was *T. brucei*.

W. Y.

Immunity.

Schilling (Claus). **Antigene Eigenschaften verschiedener Stämme ostafrikanischer Trypanosomen.** [Antigen Properties of various Strains of East African Trypanosomes.]—*Zeitschr. f. Immunitätsforsch. u. Experim. Therapie.* 1. Teil. Orig. 1914. Mar. 14. Vol. 21. No. 1/5. pp. 358-365.

The trypanosome strains with which we are accustomed to deal in Europe are obtained—with the single exception of the East Prussian dourine strain—from animals naturally infected in the tropics and are hence relapse strains. They are then kept for many years in the normal laboratory animals. Before we understood the significance of relapse strains the strains were passed from one species of animal to another. It is now known that such a procedure may give the strain quite a new character.

The work described in this paper is a continuation of the investigations of Schilling and Rondoni (see this *Bulletin*, Vol. 2, p. 356). The strain "nagana ferox" was taken to German East Africa by Schilling. During the voyage it was maintained by passage through guinea-pigs (Strain Ferox II). It was subsequently examined as regards its immuno-antigen properties and was found to have these feebly developed. Hence Schilling concludes that the passage through guinea-pigs had deprived the strain of the greater portion of its antigen properties.

Another strain of nagana was sent from Hamburg and maintained in rats during the sea voyage. This strain (Strain Ferox III) was however of just as feeble antigen producing power as the previous one. The author had therefore obtained good results with Strain Ferox I, which had been maintained in Berlin for a long period in rats and mice, and no success with Strains II and III.

The antigen producing capacity of three other strains of nagana kept at the present time in German laboratories was examined, and only one was found to furnish a serviceable antigen. During his stay on the coast of German East Africa Schilling examined seven strains of nagana obtained from various naturally infected animals. With one exception none of these strains furnished serviceable antigen.

The following are the conclusions :—

1. The old laboratory strains of Nagana are as a rule not suitable for the preparation of an active immuno-antigen. In Makatumbe a strain of nagana from the Hamburg Institute proved to be best.

2. The genuine strains which were obtained in East Africa are bad immuno-antigen producers.

W. Y.

T. Rhodesiense Infection.

Kleine (F. K.). **Zur angeblichen Identität des *Tr. brucei* und *Tr. rhodesiense*.** [On the alleged Identity of *T. brucei* and *T. rhodesiense*.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1914. Mar. 5. Vol. 77. No. 1. pp. 184-187.

Reference is made to the conclusions of Kinghorn and Yorke that a large proportion of the antelope in the Luangwa Valley is infected with human trypanosomiasis. This finding was criticised by Bevan

because of the disproportion between the number of antelope infected and the amount of sleeping sickness, and because KINGHORN and YORKE had not recorded the presence of *T. brucei* in a heavily infested *morsitans* region. Further work by BRUCE, TAUTE and FISCHER showed that *T. brucei* and *T. rhodesiense* were morphologically identical.

Recently STEPHENS and BLACKLOCK called attention to the fact that the original *T. brucei* is monomorphic and hence readily distinguishable from the dimorphic *T. rhodesiense*. Possibly *T. brucei* has changed through long maintenance in laboratory animals. If only a free flagellated strain is to be referred to as *T. brucei*, then we have the peculiar fact that *T. brucei* has disappeared from Africa; the old nomenclature must be dropped and changed to *T. pecaudi* or *T. ugandae*. BRUCE has re-examined preparations of *T. brucei* made 15 years ago in Zululand and finds that this parasite is identical with his Uganda *T. brucei*.

KLEINE continues by discussing the biological methods of differentiation of trypanosomes. Neither cross immunisation nor serum diagnosis affords much help in distinguishing between *T. brucei* and *T. rhodesiense*.

Referring to the value of pathogenicity as a means of differentiation, KLEINE believes that in most cases different trypanosomes, morphologically similar, may be distinguished by subcutaneous inoculation of a large number of the various experimental animals; he instances the differentiation of *T. congolense* and *T. nanum* by this method. [See, however, the papers of BLACKLOCK and YORKE (this *Bulletin*, Vol. 3, p. 169 and DELANÖE (*loc. cit.* p. 253).] Such a procedure, however, is valueless in the case of *T. brucei* and *T. rhodesiense*, which can only be distinguished through their behaviour in man.

Although we may not be able to distinguish between *T. brucei* and *T. rhodesiense* in game in a sleeping sickness district, nevertheless on epidemiological grounds we must consider the parasites to be different. Numerous Europeans have hunted in *morsitans* areas without contracting sleeping sickness. In many districts of East Africa cattle and dogs die at once from *T. brucei*, and human trypanosomiasis is absolutely unknown. TODD and latterly TAUTE inoculated themselves with *T. brucei* without ill effect, nor did the latter become infected after feeding on himself flies infective with *T. brucei*. [The observation recorded by TODD is given in the *Sleeping Sickness Bulletin*, Vol. 3, p. 174. Blood from a cow suffering from trypanosomiasis (species unknown) was injected into a European with negative result.]

Dealing with the hypothesis that the native population is immune, owing to a slight infection acquired in youth, the author states that he examined some 1,500 children in German East Africa with negative results.

The view that man is resistant and only slightly susceptible to infection is improbable. If an animal becomes infected with a trypanosome which is not pathogenic for it, the infection as a rule quickly dies out; *T. rhodesiense* however kills man.

The question must be considered whether in such Glossina as, owing to the absence of other food, have lived for some time on human blood, *T. brucei* has become accustomed to human serum and on that account infective for man. The experiment of JACOBY who succeeded

in making *T. brucei* in the mouse non-susceptible to human serum and of LEBOEUF, who obtained a strain resistant to the serum of Cynocephalus, are cited. However LEBOEUF found that on inoculating his resistant strain into Cynocephalus infection did not result. KLEINE and FISCHER attempted without success to render *T. gambiense* more virulent in goats by feeding tsetse, during the development of the trypanosome in them, on goats.

Since there is no epidemiological or experimental fact indicating that *T. brucei* is pathogenic for man, it cannot be held that this parasite is identical with *T. rhodesiense*. The conclusions which the English investigators draw from the frequent occurrence of *T. brucei* in wild game cannot be accepted by the author.

W. Y.

WECK. **Beobachtungen über Trypanosomen des Menschen und der Tiere am Rovuma-Flusse.** [Observations on Human and Animal Trypanosomiasis in Rovuma.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Feb. Vol. 18. No. 4. pp. 113-124.

The author examined a large number of game and some domestic animals in the district of Sasawara in Rovuma, German East Africa, and found trypanosomes by direct examination of the blood in eland, waterbuck, gnu, rappantilope [? sable antelope], reedbuck, bushbuck, ngolombwe [a small species of antelope], lion, serval, and also in goats, dogs and cattle. Monkeys, rats, and dogs were subinoculated from a number of antelopes and cattle with several positive results.

The trypanosome isolated from a waterbuck, although very similar to *T. rhodesiense*, differed from the latter in certain respects, notably that in the waterbuck strain absence of the blepharoplast was not uncommon. The movement of the long forms in fresh preparations was more active in the case of the waterbuck trypanosome than in that of the human parasite. The two strains also exhibited certain biological differences. An antelope was successfully inoculated with infected human blood,* showing that infection of antelope with this parasite may occur in nature through the bites of tsetse flies. If this be true, interference with the game for the purpose of combating the infection must be avoided, lest slightly infected game be driven into hitherto clean regions where the conditions may be favourable for the development of *T. rhodesiense* in Glossina and hence more game and men infected. It would be necessary to annihilate the game completely, and this is a measure which the author regards as impracticable. [This argument is based on the assumption that the human and game trypanosomes are different and that game are only infected with *T. rhodesiense* in those regions in which man is known to be infected, in other words that the game derives its infection from man. If it be granted that game can be infected with *T. rhodesiense* from man, it is difficult to see why *T. rhodesiense* should not have spread amongst antelope as widely as the common pathogenic trypanosomes of domestic stock e.g. *T. vivax* and *T. pecorum*.]

Infected human beings must always be regarded as the most important carriers of the virus and constitute the greatest danger for

*This experiment is not free from objection because the antelope harboured a trypanosome before it was inoculated with *T. rhodesiense*.

A. G. B.

their neighbourhood. In all probability the disease has been smuggled into German East Africa by immigrants from Portuguese territory, so prophylactic measures must be directed towards the systematic examination of all natives entering the colony and medical examination of infected districts for the purpose of detecting and isolating infected cases.

In an appendix the author gives further details of his work. The thick film method of blood examination was always adopted. The investigations were carried on during the colder season of the year (shade temperature at 2 p.m. being 22-24° C. whilst at 5 to 6 a.m. it was only 11° C.). All cases found up to the present are from Portuguese territory or from regions into which Portuguese natives have immigrated. The proportion of infected to non-infected is about 7 per mille. The percentage of infected flies was 5 to 15 per cent (109 infected out of 1,090 examined). [The author does not state with what trypanosomes these flies were infected nor how many of them were actually infective.] Attempts to render laboratory bred *Glossina morsitans* infective by feeding them on sleeping sickness cases were unsuccessful. W. Y.

NYASALAND PROTECTORATE. **Sleeping Sickness Diary. Part xxii.** By the Principal Medical Officer.—10 pp. Zomba. Printed by the Government Printer.

Nineteen additional cases of Sleeping Sickness have been notified during the four months from October to December, making a total for the year 1913 of 64 cases, as compared with 46 cases in 1912 and 38 in 1911. A table is given showing the distribution of the cases notified last year. Of the 64 patients 43 were males and 21 females. Short clinical accounts of the 19 fresh cases are given.

HEARSEY writes that the preventive measures instituted in the Proclaimed area of the Dowa district are reported to be attended with satisfactory results. Clearing operations are progressing satisfactorily; voluntary labour is being employed. The village latrine system, which was instituted to prevent natives from visiting the bush for the purpose of defaecation, is not working as satisfactorily as could be desired, but it is hoped with the application of a little pressure better results will follow. Every effort is being made to induce natives to use timber already felled in the course of clearing operations for hut building and firewood. The chiefs are advised to remove their villages from danger zones, but this is not compulsory.

Probably the Marimba district is infected to the same extent as the Proclaimed area in the Dowa district, 11 cases having been found there during a period of 3 months investigation. The Dedza, South Nyasa and Upper Shire districts, however, have furnished four cases only. W. Y.

PROPHYLAXIS.

PRIMET. **La Prophylaxie de la Trypanosomiase Humaine en Afrique Equatoriale Française.**—*Trans. xvii Intern. Congress of Med.* London. 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2. pp. 287-294.

An account is given of the work of inspection and prophylaxis against Sleeping Sickness carried on at Brazzaville. All natives who for purposes of labour are required to move from one part of the

colony to another must present themselves for examination at the local Pasteur Institute, where they are classified as "trypanosomé" or "non-trypanosomé." A strict clinical examination is first practised and any suspects are set aside for further examination. In these, fresh preparations of the blood and gland juice are examined. In the event of this being negative, trypanosomes are sought by centrifuging a quantity of the blood, and finally lumbar punctures may be made, or the patient placed in an isolation camp for observation.

Between October 1909 and December 1912 some 15,570 natives were thus examined at Brazzaville and 843 were found to be infected with sleeping sickness. For purposes of treatment the patients are divided into two classes: (*a*) Those who are sufficiently well to do enough work to maintain themselves; these are required to present themselves for examination and treatment at stated intervals. (*b*) Those who are too ill to work; these are placed in an isolation camp. A description of the camp is given.

AUBERT and HECKENROTH have studied the action of various medicants with a view to ascertaining which was the most active and most lasting in its effects. They worked successively with orpiment, atoxyl and arsenophenylglycin. A brief summary of their results is given (see this *Bulletin*, Vol. 2, p. 35).

Medical tours have been organized for the purpose of examining outlying villages and treating infected persons. With respect to the general hygienic measures which have been adopted, the author writes that it is a well known fact that trypanosomiasis works greatest havoc amongst a population living in poor hygienic conditions and where the food supply is deficient. Attempts are being made to improve the condition of the natives living in such conditions. Villages situated in thick fly zones have been removed. Clearing of the scrub and bush is being undertaken so far as is possible.

The paper closes with a summary of measures taken to protect Europeans against Sleeping Sickness.

W. Y.

ANIMAL TRYPANOSOMIASIS.

ROBERTSON (M.) *Part 1.*—**Report on the Present Condition of the Masindi District of the Northern Province in regard to Cattle Trypanosomiasis.** *Part 2.*—**Report on the Present Condition of the Kafu River District and of Buruli in regard to the Spread of Trypanosomiasis.**—Report to the Colonial Office. Received 9th Dec. 1913.

This report records observations made on a safari in the Northern Province of Uganda during June, July and August of last year.

The author gives the following general summary of her conclusions:

"1. The whole of the country, from the northern part of the Saza of Bulimwesi right up to the Hoima-Masindi Road and the Budongo Forest, must now be looked upon as an area permanently infected with cattle trypanosomiasis. This vast tract, which includes the whole Saza of Buruli, including the bush country to the west of the Lugogo River (Butengesa, Kijogolo, and Kijaguso) has become infected within the last 10 to 13 years from the central focus of the Nakasongola District.

"2. The origin of this whole infection can be traced to the moving of large herds of cattle from the south, south-west, and south-east, into the

Nakasongola District in 1900. These cattle were moved into this *morsitans*-ridden country without being subjected to any examination whatsoever.

"3. The disease was carried north of the Kafu by the moving of a single infected herd from Nakitoma in Buruli to Kibangaya, in the Northern Province, in the year 1906.

"4. The whole of the area aforesaid must be looked upon as *morsitans* country. This fly, *Glossina morsitans*, is responsible for the spread of the disease in question. *Morsitans* extend over large areas beyond the recognised fly-belts; the distribution varies greatly according to the season of the year, the fly invading a very much wider area during the wet months.

"5. The percentage of infected flies in the Masindi fly-belt, which crosses the Masindi Port Road, is 10 per cent, an amazingly high figure. This has been produced in the space of six years.

"6. Trypanosomiasis of all kinds (human and animal) could be stamped out entirely and permanently from any district within two years were it not for the game reservoir. It is important to note in this connection that the cattle trypanosome *T. vivax*, the species which has travelled the most rapidly through this district, is unable to survive in any but the large domestic animals (cattle and goats) and the big game.

"7. All trypanosomes of the Gambiense group (i.e., *T. gambiense*, *T. brucei*, and *T. rhodesiense*) introduced into any part of this country which extends from Bulimwesi to the Budongo Forest will ultimately cause a very serious loss to human life in the fly-belts round Masindi. This loss of life will occur especially among the Europeans travelling between the Victoria Nile via Masindi to the Congo and the Soudan.

"8. In the great opening up of the Buruli District about to take place within the next few months, the most stringent care must be taken to avoid the introduction of any of the human group of trypanosomes. The loss of life in Buruli would probably be slight, but the fly and game would pass such a form quite rapidly to the great main artery of traffic round Masindi, where the fly are distributed in thick belts. Mules, donkeys, and domestic cattle are all capable of conveying this type of trypanosome.

"9. *T. rhodesiense*, pre-eminently a *morsitans* trypanosome, is already present in German East Africa, and *morsitans* extends practically from the German border through Ankole and Katwe to the Northern Province. A narrow range of hills, and a fairly large area of well cultivated land, is all that separates Bulimwesi from the south-western belts. A trypanosome of the gambiense group with posterior nuclear forms was got by Dr. Duke from Ankole during his recent safari.

"10. Precautionary measures are urgently required. All cattle and mule transport must be stopped unless carried out under the most rigid and efficient microscopical examination and quarantine of the animals so employed. All roads in *morsitans* areas (especially and notably the Masindi Port to Butiabwa Road) should be cleared of bush on either side throughout its whole extent, and planted with some low-growing crop, such as cotton or sweet potatoes. The optimum width for the strip of cultivation must be ascertained by experiment. Grass should be systematically burnt at least once yearly in fly country.

"11 It cannot be too seriously urged that, owing to the presence of *morsitans* and large quantities of game, vast tracts of the Uganda Protectorate form at the present time an ideal environment for the fostering and dissemination of human trypanosomiasis.

---

*With reference to Miss Robertson's conclusion 7, it may be noted that *T. gambiense* was introduced into Unyoro, including the neighbourhood of Masindi, at least ten years ago, and infected natives passed through it for some years. There is however no evidence of infection arising in this area, but only in surrounding *palpalis* areas. As regards conclusion 9, *T. rhodesiense* has been reported from the southern border of German East Africa, at least 10° south of the equator, but nowhere to the north of this line. The region with which Miss Robertson is dealing is north of the equator, some 11° removed. A.G.B.

"12. Had *T. rhodesiense* been one of the species taken to Nakasongola in 1900, the Masindi Port Road and both the Masindi-Kampala Roads would, at the present time, be absolute death traps. To take any one speciesof trypanosome in the Masindi fly-belt, the fly are infected at least at the rate of thirty per thousand, and in Nyasaland and Rhodesia a percentage of two per thousand has caused sufficient loss of life to call forth two commissions of investigation, and to seriously inhibit the development of certain parts of the country."

Miss ROBERTSON records the existence of an interesting state of affairs at Butiabwa on Lake Albert. Here fly, game and cattle are found in close contact without the disease having appeared. The author considers the reason of this to be that the game which travel round the bush to the north and east of Masindi from the Kafu District are checked by the escarpment and do not travel into the Butiabwa area; hence, as the game area is not continuous, there is no continuity of the reservoir of trypanosome diseases. In the same way the game to the south of the Kafu is not continuous with that north of the river, and so the author concludes that the moving of domestic herds was responsible for bringing the trypanosome diseases into the country north of the Kafu. [This observation if confirmed is obviously one of great importance. The reviewer is however disposed to doubt if antelope anywhere in *morsitans* areas are free from trypanosomes pathogenic to domestic stock. It is difficult to imagine that any natural barrier would prevent a certain number of game, some of which would probably be infected, from migrating from one district to another.] In a covering letter Dr. HODGES, Principal Medical Officer of Uganda, states that he is unable to share Miss ROBERTSON'S conclusions as to the urgency of the situation in Uganda with regard to the danger to human life from trypanosomiasis conveyed by *Glossina morsitans*.

W. Y.

BRAUN (H.) & TEICHMANN (E.). **Erfahrungen über die tierischen Trypanosomen-Krankheiten Deutsch-Ostafrikas.** [On the Animal Trypanosome Diseases of German East Africa.]—*Beihefte z. Arch. f. Schiffs- u. Tropenhygiene.* 1914. Jan. Vol. 18. Beiheft 1. pp. 5-39. With 2 text figs. & 1 coloured plate.

TEICHMANN (Ernst). **Die tierischen Trypanosomen-Krankheiten Deutsch-Ostafrikas. (Aus den Ergebnissen einer Studienreise.)**—*Entomolog. Zeitschr.* 1913. Aug. 16. Vol. 27. No. 20. pp. 109–110.

BRAUN (H.). **Ueber die tierischen Trypanosomen-krankheiten Deutsch-Ostafrikas.**—*Berlin. klin. Wochenschr.* 1914. Feb. 16. Vol. 51. No. 7. pp. 297-299.

TEICHMANN (E.). **Uebertragungsversuche mit Glossinen.**—*Berlin. klin. Wochenschr.* 1914. Feb. 16. Vol. 51. No. 7. pp. 299-300.

These four papers deal with the same observations. BRAUN and TEICHMANN refer in some detail to their previous work on immunisation against trypanosome infection by vaccines (see *Sleeping Sickness Bulletin*, Vol. 4, pp. 58 and 293).

The authors examined 487 cattle from different parts of German East Africa and in fresh preparations of the blood of 34 trypanosomes

were found. From 29 of these subinoculations were made into rats or rabbits. In all, 15 strains were thus obtained, but one of them was lost. Of the remaining 14, eight proved to be nagana strains whilst the remaining six corresponded to the *congolense* type.

i. *Nagana.*—All eight strains exhibited the same morphological characters; they were typically dimorphic. They were all pathogenic for rats, but exhibited certain quantitative variations of virulence, some strains killing the animals in 14 days whilst with others the rats lived for as long as 4 months. Mice behaved similarly but the disease was as a rule of shorter duration. In rabbits the disease ran a chronic course and the animals developed the characteristic symptom-complex. The infection produced no external symptoms in guinea-pigs but the majority of the animals died. The biological reactions of these strains were compared with those of a nagana strain (St. 4) taken out to Africa by the authors. The result of this work showed that the antigen of the original East African nagana strains was not identical with that of the European strain. It is noteworthy that the European strain St. 4 could be distinguished from the African nagana strains not only biologically but also morphologically, as it was found to be monomorphic, whereas the African strains were typically dimorphic. [In this connection the paper of STEPHENS and BLACKLOCK should be consulted (see this *Bulletin*, Vol. 1, p. 662).]

Possibly the African strains had become serum fast through inoculation from rat to rat, and with the object of avoiding this the authors attempted to pass their most virulent strain (St. 90) through Glossina and then to infect rats directly from the tsetse. Their efforts to infect *G. brevipalpis* were not very successful. Large numbers of wild tsetse were caught and fed on laboratory animals, but in not a single case did infection with nagana result although *T. congolense* infections were common. Attempts were then made to infect wild *G. brevipalpis* by feeding them on infected animals, the flies being subsequently fed in groups on rats. Only one rat became infected and this unfortunately developed a double infection of nagana and *T. congolense*. As perhaps the atmospheric conditions might account for this failure to render the tsetse infective, the authors repeated the experiment of KINGHORN and YORKE (see this *Bulletin*, Vol. 1, p. 126). Laboratory bred flies were fed on an infected animal and then placed in an incubator at a temperature of from 30–37° C; the atmosphere was kept moist by means of dishes of water. Development of the trypanosomes was found to have taken place in a proportion of those flies which died during the experiment, and in certain flies examined 16 days after the infecting feed large numbers of developing trypanosomes were found. The flies however did not infect when they fed, but on the contrary inoculation of the abdominal contents into 5 mice gave positive results in 2 cases. From these observations it appears that temperature and humidity influence the development of the trypanosome in the fly. The authors draw attention to the fact that the flies were not able to transmit the trypanosomes by feeding although they harboured virulent parasites.

The tsetse fly strain obtained by successful inoculation of two mice with the abdominal contents of the fly was maintained in rats and its biological reactions examined. It was found that they were analogous to the European strain (St. 4). Another interesting point is that not

only was it biologically similar to the European strain but also morphologically, in that it was no longer dimorphic. On comparing the tsetse fly strain with the various African nagana strains it was found that passage through the fly had not altered its antigen properties.

ii. *Paranagana.*—Amongst the African trypanosomes there is a whole series of parasites characterised by their small size and the shortness of their flagellum. They have been given various names (*T. congolense* BRODEN, *T. pecorum* BRUCE, *T. nanum* LAVERAN, and *T. frobeniusi* WEISSENBORN). Such small trypanosomes were found by the authors in cattle, mules, donkeys, sheep, goats and dromedaries. The parasite is widely distributed in German East Africa. Through inoculation into rats seven strains were obtained. These were examined as regards morphology and pathogenicity. A brief description of the morphology is given; there is nothing in it that calls for special attention; all the seven strains were similar.

The pathogenicity of each of the seven strains for rats, mice, guinea-pigs and rabbits is given. As a rule the various strains gave rise to chronic infections in these animals; there was however considerable variation in their virulence. Many of the rats and guinea-pigs inoculated failed to become infected.

BRAUN writes that it is probable that in addition to tsetse flies other biting insects (Stomoxys and Tabanids) can transmit this trypanosome, as he has found cattle infected in localities where tsetse does not exist.

[It is necessary to draw special attention to the statement that a dimorphic trypanosome after passage through the tsetse changed morphologically in that it became monomorphic. In view of other work along these lines this statement requires further examination before it can be accepted.]

W. Y.

DELANOË (P.). **Le Fonctionnement du Service de Prophylaxie à Bouaké (Côte d'Ivoire) à l'égard des Trypanosomiases animales, du 10 juin au 31 déc. 1913.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 152-160. With a map.

This paper describes the prophylactic work, as regards animal trypanosomiasis, carried out on the Ivory Coast since June 1913. The blood of animals passing through Bouaké is systematically examined. Only those beasts in which the blood was negative (a single examination was made) are allowed to descend to the coast; the animals found to be infected were retained at Bouaké; if they were sufficiently fat, they were sent to the butcher. An isolation park is being constructed so that the infected animals can be kept under examination.

In all 4,086 animals (2,115 oxen and 1,971 sheep) were examined. Of these 214 only came from the Ivory Coast, the remaining 3,872 were from Upper Senegal and Niger. Of the 2,115 oxen 445 (21 per cent.) were infected and 99 (4·6 per cent.) were rejected as being too emaciated; of the 1,971 sheep 206 (10·4 per cent.) were infected and 16 (·8 per cent.) were very emaciated. Thus approximately 25 per cent. of the inspected cattle and 11 per cent. of the sheep had to be rejected.

The trypanosomes encountered were, in order of frequency, *T. cazalboui*, *T. dimorphon* and *T. pecaudi*. The last parasite is found

most rarely on microscopic examination. In 89 infected cattle seen in December *T. pecaudi* was encountered only 3 times. The parasite is however much more widely spread than microscopic examination of the cattle blood indicates. It was frequently isolated as a pure strain by subinoculation of rats. This was possible, as *T. dimorphon* in the blood of naturally infected cattle and sheep is only exceptionally infective for rats [see this *Bulletin*, Vol. 3, pp. 169 and 253].

The administrative authority has strongly criticised these sanitary measures; it sees in them only a restriction of commerce. It is however impossible not to recognise that, apart from all prophylactic considerations, the active surveillance exercised at Bouaké has improved considerably the quality of the cattle.

W. Y.

TRAUTMANN (R.). **Inoculation positive de *Trypanosoma cazalboui* à un *Cercopithecus patas*.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 118-121.

This paper records an instance of successful inoculation of a monkey (*Cercopithecus patas*) with *T. cazalboui*. The monkey was injected subcutaneously with 5 cc. of blood from a naturally infected ox, shortly before the death of the latter; trypanosomes were found in its blood on the sixth day and the animal died after 11½ days. The parasites were found in the blood in small numbers only; auto-agglutination was well marked. Post mortem it was found that there was considerable enlargement of the lymphatic glands.

A native dog, a guinea-pig, a monkey (*Cynocephalus*) and a rat subinoculated from the *Cercopithecus patas* on the 9th day of the disease did not develop the infection, but parasites were found in the blood of a sheep eight days after inoculation and it developed a chronic infection. Two *Cercopithecus patas*, a rabbit, a guinea-pig and a goat were inoculated from the sheep; only the goat became infected.

The author writes that he intends to conduct experiments to ascertain whether *T. cazalboui* obtained from infected calves possesses a particular virulence rendering it pathogenic for *Cercopithecus*. [This paper should be compared with that of BLACKLOCK and YORKE on *T. vivax* in rabbits (see this *Bulletin*, Vol. 3, p. 168).]

W. Y.

MOHLER (John R.), EICHHORN (Adolph) & BUCK (John M.). **The Diagnosis of Dourine by Complement Fixation.**—*Jl. Agricultural Research.* Dept. of Agriculture, Washington. 1913. Nov. 10. Vol. 1. No. 2. pp. 99-107.

After giving a brief account of the history of dourine in the United States the authors discuss the various methods of diagnosis. The recognition of chronic and latent forms of the disease is difficult; it is frequently impossible to demonstrate *T. equiperdum* in affected horses, although the parasite may occasionally be found in the serous exudate of the plaques and in the fluid from the oedematous swellings of the genital organs. Accordingly an investigation was made to determine the reliability of the complement fixation method of

diagnosis. The problem of obtaining a satisfactory antigen proved to be one of considerable difficulty. In the past the most promising results were got by those investigators who employed suspensions of trypanosomes as antigen. The preparation of such suspensions is, however, very laborious and an attempt was made to devise a means, by which an equally reliable antigen could be obtained without such elaborate technique as is involved in the preparation of a suspension of pure trypanosomes.

Owing to the fact that the reaction is not absolutely specific but rather of a group nature, antigen was obtained from the blood and macerated spleens of *T. evansi* infected rats, the material being shaken in a bottle with glass beads for 6 hours, filtered through gauze and carbolised. After various trials it was found that the results obtained from the fresh suspension of the macerated spleen of a rat just dead from surra were the most promising. The spleens were removed and ground up in a mortar with a small amount of salt solution. From time to time more of the salt solution was added and the suspension thus obtained filtered through gauze. The quantity of the suspension from each spleen was made up to 40 cc. by dilution with salt solution. The manner in which the antigen is titrated is described. Half the quantity of antigen which in the negative serum does not inhibit haemolysis, provided this quantity is at least double the amount necessary to produce complete fixation with the positive serum, indicates the titre of the antigen.

For the complement fixation test a haemolytic system consisting of sensitized rabbit serum, normal guinea-pig serum and a 5 per cent. suspension of sheep's erythrocytes was used. The serum to be tested was inactivated and employed in quantities of ·15 c.c. (·02 c.c. was the smallest amount of infected horse serum which caused complete fixation).

The authors are of the opinion that the diagnosis of trypanosome infections of both man and animal by the method of complement deviation is of very great importance. By such means it is possible to determine all infected persons or animals within a short time.

W. Y.

BRUMPT (E.). **Réduvides de l'Amérique du Nord capables de transmettre le** *Tryp. cruzi.—Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 132-133.

A brief review of the literature dealing with the transmission of *T. cruzi* is given. The trypanosome was found in naturally infected *Conorhinus megistus* by CHAGAS and has since been found in naturally infected *C. infestans* and *C. sordidus*. BRUMPT has shown that *T. cruzi* develops in various bugs (*Cimex lectularius*, *C. rotundatus* and *C. boueti*) and in *Ornithodorus moubata*. In conjunction with GONZALEZ LUGO the author found that *Rhodnius prolixus* is able to transmit the infection. Quite recently NEIVA demonstrated that *Rhipicephalus sanguineus* can act as an intermediate host.

BRUMPT fed two larvae of a *Conorhinus* from Texas on a mouse infected with *T. cruzi*. They became infected at the first feed and their faeces contained a pure culture of the parasite.

W. Y.

Bionomics of Glossina.

Lloyd (Ll.). i. **Further Notes on the Bionomics of *Glossina morsitans* in Northern Rhodesia.**—*Bull. Entom. Research.* 1914. Apr. Vol. 5. Pt. 1. pp. 49-60. With 4 plates, a map and 1 text fig.

ii. **Note on Scratching Birds and Tsetse-Fly.**—*Ann. Trop. Med. & Hyg.* 1914. Apr. 21. Vol. 8. No. 1. p. 83.

i. The author's summary and conclusions are as follows:—

"1. *G. morsitans* is willing to feed on small mammals, birds and reptiles; its ability to do so depends on their agility. As it haunts the sleeping places of many of these it probably feeds on them to some extent when they sleep.

"2. Reptilian blood is not suitable to *G. morsitans* as a continued diet. Mammalian blood has a slight advantage over avian as a diet, and this is shown by the larger average size of the pupae produced in the laboratory.

"3. Some experiment is necessary to determine finally the relation of *G. morsitans* to the larger mammals. This could be carried out in a large fly-proof cage.

"4. The one feature common to the breeding places found is that in close proximity to each there is some relatively dark place where the mother fly can hide during pregnancy.

"5. Pupae are deposited in much larger numbers close to places where large mammals are certain to pass frequently (*e.g.* paths, native and game, fords, drinking places) than in places in the general bush.

"6. On the high plateau of Northern Rhodesia *G. morsitans* begins to breed freely about the second month of the dry season (July) and almost or entirely ceases to do so in the rainy season."

With reference to (1), the author notes that many of the small mammals are nocturnal and spend their days sleeping in hiding places which are in many cases haunted by tsetse flies. It is a very common experience, he writes, to see tsetse fly out of a burrow in the ground or hollow in a tree, while the number of pupae which are taken in such positions show that they are much frequented by the female flies. It is therefore possible that these small animals supply a larger proportion of the food of the tsetse flies than is generally supposed.

With reference to (2), the reptile used in the author's experiments was the chameleon. The flies did not feed well upon these; they frequently inserted their proboscides without obtaining blood. The editor, Mr. Guy Marshall, points out that, as noted by Carpenter and Duke, *G. palpalis* feeds freely in the Lake Victoria district on monitor lizards. In this case also laboratory experiments indicated the unsuitability of reptilian diet. The small size of the pupae produced on a diet of avian blood is considered by the author to be due to the pressure of the clots of blood which form in the sucking stomach when the flies are so fed.

The author's observations summed up in his fifth conclusion are of special interest. In an area of about two square miles he found 174 breeding places, which he mapped out in relation to the game paths and human paths and a stream. When these were classified as positions yielding less than 10 pupae each, positions yielding from 10 to 50 pupae, and positions yielding between 50 and 150 pupae, it was found that the latter bore a close relation to the paths, nine of them being within a yard and the remaining four less than 100 yards from a path. This is shown on a map. He points out that it is of evident advantage for the newly hatched fly to have a certain supply of food in its immediate neighbourhood. The pupae were found in hollows in trees,

in some instances exposed on the surface of hard clay; below trees or branches sloping at an angle; beneath fallen dead trees or branches (the majority); and in a few instances in stumps in termite nests, in the burrows of bush-pig or warthog, and in salt licks. Eight photographs show the character of the breeding places.

ii. From time to time suggestions have been made that various scratching birds, such as guinea fowl, the Indian jungle fowl and the domestic fowl, might keep down Glossina by devouring the pupae. The author notes that guinea fowl are extremely numerous in Northern Rhodesia. He examined the crops of ten at Nawalia in the Luangwa Valley. They contained vegetable matter, small bulbs, roots and flower buds; in three only were insects found and then in very small numbers. No pupae of any kind were recorded. The conclusion is that the guinea fowl is a vegetable feeder.

A. G. B.

Austen (E. E.). **A Dipterous Parasite of** *Glossina morsitans*.—*Bull. Entom. Research.* 1914. Apr. Vol. 5. Pt. 1. pp. 91-93. With 1 text fig.

This fly was received from Mr. Ll. Lloyd, Ngoa, Northern Rhodesia. It belongs to the family *Bombyliidae*, sub-family *Exoprosopinae*, genus *Villa*, Lioy, and is named *Villa lloydi*, sp. nov. A full description and figure are given. The specimen, 5·75 mm. in length, was bred from a puparium of *Glossina morsitans*. Mr. Austen states that it is the first Dipteron to be recorded as parasitic on a tsetse fly.

A. G. B.

Shircore (J. O.). **Suggestions for the Limitation and Destruction of** *Glossina morsitans*.—*Bull. Entom. Research.* 1914. Apr. Vol. 5. Pt. 1. pp. 87-90. With a sketch map.

Several months' constant travelling in the "proclaimed area" of Nyasaland has led the author to conclude that it contains at least four "primary centres" which harbour *G. morsitans*. These are shown on a sketch map. He states that flies are found here abundantly throughout the year, being present in these situations when there are none or extremely few elsewhere, and the whole remaining country is bare of grass and foliage. These are the only areas where, in the dry season, water is obtainable. Here in the drought there are herds of game and there is light forest. The author believes that the flies breed at these centres and from them extend into the surrounding country along connecting forest when the conditions become suitable. He advocates that the forest connections, along which radiation takes place, should be cut off early in the year so as to isolate the primary centres, which have been delimitated at the height of the previous dry season. The primary centres should then be destroyed by cutting and subsequently burning.

He also gives the results of clearings made in the neighbourhood of villages, which appear to have been effective in diminishing the flies. Each area must be dealt with, he finds, according to its particular requirements.

A. G. B.

Woosnam (R. B.). **Report on a Search for Glossina on the Amala (Engabei) River, Southern Masai Reserve, East Africa Protectorate.**—*Bull. Entomol. Research.* 1914. Feb. Vol. 4. Pt. 4. pp. 271-278. With a sketch map.

The river in question, as is shown on the map, is near the Anglo-German boundary and about 70 miles from the Victoria Nyanza. Some specimens of Glossina were obtained and identified by Mr. Austen as *G. fusca* Walk., a species which is sometimes crepuscular in its habits. Mr. Woosnam suggests that the fact that he was unable to obtain a single specimen during a whole day's search is explained by this. He can testify from personal experience that *G. pallidipes* in East Africa feeds greedily during the whole night, but not during the day time. He remarks that *G. fusca* has not been recorded previously from the East Africa Protectorate, and that the altitude, 5,200 feet, is the highest at which any species of Glossina has been found to exist permanently. The fly was apparently confined to one bank of the river. He notes that natives with their cattle, sheep and goats have been living for many years practically in contact with the fly, in spite of the fact that several sportsmen have lost mules and trek oxen in this region. Of this there are two possible explanations: (1) that the natives are so familiar with the distribution of the fly that they hardly ever expose their cattle to infection; (2) that only a very small percentage of the flies are infective, either owing to the reservoir being very limited or to unfavourable climatic conditions.

A. G. B.

Yorke (Warrington) & Blacklock (B.). **The Differentiation of the more Important Mammalian Trypanosomes.**—*Ann. Trop. Med. & Parasitol.* 1914. Apr. Vol. 8. No. 1. pp. 1-12. With 1 plate.

The authors write that "a given trypanosome may present characteristic features either in the vertebrate or in the invertebrate host, if such exist, and must therefore be examined in both of these where possible." The methods of identification which can be applied to the parasite as it appears in the vertebrate host are reviewed under the following heads: motility, morphology, pathogenicity, symptomatology and serum diagnosis.

For the purpose of differentiating species the authors consider the ordinary qualitative morphological characters such as the presence or absence of a free flagellum, the position of the nucleus, and the size, shape and position of the blepharoplast, to be of more importance than the quantitative characters which require mathematical expression for their appreciation. Dealing with the value of biometric graphs for distinguishing various species of trypanosomes, they consider that in the case of the monomorphic trypanosomes, such as *T. congolense* and *T. vivax*, the curves may be regarded as characteristic. With regard to the polymorphic trypanosomes, such as *T. rhodesiense* and *T. gambiense*, so much diversity of form exists between the curves made by various workers that little or no value can be attached to this method of differentiation. In the opinion of the authors "the only valuable information to be obtained from measuring polymorphic

trypanosomes is the range of variation in size of the individuals, or in other words, the maximum and minimum lengths."

The accumulated evidence of recent years has shown that pathogenicity is by no means so reliable a criterion for differentiation of trypanosome species as was formerly thought. Their virulence has frequently been increased by long passage through laboratory animals. An example of this is seen in the case of *T. gambiense*.

" In so far as small laboratory animals and goats, donkeys and horses are concerned, it is impossible to state from the symptoms exhibited with which species of trypanosome the animals are infected." " Subcutaneous swellings, loss of hair, blepharitis, interstitial keratitis, oedema and ulceration of the genitals and mucous membranes are produced equally by many different species of trypanosomes." Probably the plaques seen in horses suffering from dourine are characteristic of this infection.

Regarding agglutinins, cytolytic sera, phagocytosis, phenomenon of attachment and complement deviation, as these are probably not specific they are of no diagnostic value. The authors have no personal experience of the value of immunisation and cross immunisation.

The paper concludes with a consideration of the value, as an aid to differentiation of species, of the cycle of the trypanosomes in their invertebrate hosts. As it seems probable " that all varieties of tsetse are capable of transmitting most, if not all, of the African pathogenic trypanosomes," the fact that a certain trypanosome is known to be transmitted by a particular tsetse does not warrant the differentiation of the trypanosome from another known to be spread by a different tsetse fly. The manner in which the parasite affects the tsetse is, however, of great importance. " By this means the African trypanosomes may be divided into the following three groups :—(i) Those in which the development of the parasite is limited to the proboscis, *T. vivax* (*T. cazalboui*), *T. uniforme*, *T. caprae*. (ii) Those in which the first portion of the developmental cycle takes place in the gut and from thence the infection spreads forwards and takes up its anterior station in the proboscis, *T. nanum*, *T. congolense*, *T. simiae*, *T. pecaudi*. (iii) Those in which the first portion of the cycle takes place in the gut and the final portion in the salivary glands, e.g., *T. gambiense*, *T. rhodesiense* and a polymorphic trypanosome described by Duke in Uganda."

The period of incubation of trypanosomes in Glossina and their morphological characters in the fly are of no value as an aid to differentiating species.

The table in which the salient characters of the more important mammalian trypanosomes are indicated in heavy type is reproduced. A plate depicts the more important trypanosomes.

H. B. Fantham.

HENNINGFELD (Fr.). **Ueber die Isolierung einzelner Trypanosomen.**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1914. Mar. 21. Vol. 73. No. 3. pp. 228-240.

The author gives an account of a number of experiments made by him on the isolation of single trypanosomes and on the results obtained by inoculating single trypanosomes to mice. The strains of patho-

genic trypanosomes used were *Trypanosoma brucei* ("ferox" strain) and *T. equiperdum* (East Prussian strain, 1908). The practically non-pathogenic *T. theileri* of cattle was also used.

The isolation of the single trypanosomes was made by LINDNER's drop method and by means of the capillary tube. With the use of the capillary tube, they lived longer than when obtained by the drop method. When serum was used as the diluent, the maintenance of activity of the trypanosome was more prolonged than when salt solution or bouillon was employed. The infection of mice by single specimens of *T. brucei* and *T. equiperdum* was found to be easier than that of either *T. theileri* or the so-called cultural flagellates of cattle blood, the latter being relatively few in numbers. Attempts at subcultures from single cultural flagellates proved unsuccessful, nor could calves be infected by single *T. theileri*. Similarly, cultural flagellates were only transmissible to cattle when large quantities were inoculated.

H. B. F.

MARULLAZ (M.). **Contribution à l'Etude des Trypanosomes des Oiseaux, deux Espèces nouvelles.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 115-117. With 7 text-figs.

Trypanosoma lagonosictae n.sp., was found in smears of the liver and lung of one specimen of the bird *Lagonosticta senegala*, a native of Equatorial Africa. The parasites were very rare, and those seen appeared to be monomorphic, 22μ to 25μ long (including free flagellum 2μ to 3μ) and 5μ to 7μ broad. The posterior (non-flagellar) end is sharply pointed and the flagellar border of the undulating membrane is relatively straight. Parasites were not seen in fresh blood, although seven birds were examined. Two trypanosomes are figured.

Trypanosoma liothricis, n.sp., is a large organism with folded membrane, found in the blood of *Liothrix luteus*, the Japanese nightingale. The parasite is very rare. Cultures of heart blood were made on simplified medium of NOVY, wherein the trypanosomes grew abundantly. In 12 to 15 days various cultural forms were seen, large, small, stumpy and rosettes. They were mostly crithidial in facies. These are figured and their dimensions are given. The author was unable to inoculate birds from cultures.

H. B. F.

MALARIA.

ZIEMANN (H.). **Ueber neuere Probleme der Tropenmedizin.** [New Problems in Tropical Medicine.]—*Zeitschr. f. Balneologie.* 1913-1914. Vol. 6. No. 23. pp. 1-10.

Professor Ziemann in an instructive address has broached a number of as yet unsolved and debatable problems for which he has various solutions to offer.

The tendency of the benign tertian parasite to gametocyte formation during the early summer months, just previous to the maximum prevalence of the anopheline definitive host, he attributes to the number of clinical relapses resulting from climatic causes in temperate zones during the months of April and May.

The prevalence of the different species of malarial parasites at different seasons of the year is also unexplained. Under experimental conditions the optimum temperature required to ensure development of these species has been found to be the same; there is therefore no valid reason why the epidemiological curve of the different kinds of malaria should not be identical. [In contrast to this statement GRASSI, JANCSO and others have pointed out that the subtertian parasite demands a higher temperature for its development in the mosquito than suffices for the tertian and quartan.] This peculiarity Ziemann attempts to explain by drawing an analogy with the vegetable kingdom in which the prevalence of different flowering species at different seasons of the year is a matter of common observation; that the sporozoites are incapable of surviving the winter in a hibernating mosquito appears certain, both from the work of Indian workers and of Ziemann himself in Wilhelmshafen.

No satisfactory explanation of great malarial pandemics in regions endemic to malaria has ever yet been advanced. The author considers that a combination of circumstances, all of which are not yet sufficiently understood, are necessary, such as numbers of gamete carriers, the presence of the suitable anophelines and certain climatic factors, as humidity, sunshine, wind and electric state of the atmosphere. It is also possible that the nature of the food, as for instance, certain plant juices ingested by the mosquitoes, has a definite inhibitive or stimulating action on the development of the parasites in the bodies of these insects.

It is instructive to note that a distinction between recrudescences of malarial infection, which can take place eight days after the original attack, and true relapses is drawn and that no support is found in artificial cultures at least for SCHAUDINN'S hypothesis, by which he attempted to explain the latent stage of the parasite by a parthenogenesis of the macrogametocyte in the internal organs. Ziemann is inclined to postulate a small residual schizogonic infection.

The incubation period of malaria is also subject to great variation; under normal conditions it is 12-14 days, but it may extend over months and even one and a half years, as in a case which Ziemann himself observed. For the diagnosis of latent malaria the mononuclear leucocytosis is of the greatest, urobilinuria (PLEHN) of the least value. Complement-fixation reactions will probably be utilized in the future in diagnosis and possibly, since the author has been able to grow piroplasma by cultural methods even when sparse in the peripheral

blood, blood cultures will be useful for diagnostic purposes by demonstrating latent parasites.

As regards the artificial culture of malaria parasites Ziemann states that the following conclusions can be safely drawn :—

(1) That no conjugation or parthenogenesis of the parasites takes place in culture.

(2) That no transmigration of parasites from one corpuscle to another takes place.

(3) That the different species retain their morphological and biological characters in culture.

(4) That a certain number of malignant subtertian parasites become crescent forms.

On the other hand he has been unable to confirm Bass in one point, namely that it is possible to cultivate the parasites *ad infinitum* without the intervention of a sporogonic cycle.

The presence of dextrose in the culture appears to prevent haemolysis and to facilitate the penetration of the red cells by the young merozoites.

As regards therapeutic measures the author is of the opinion that it is desirable to discover other remedies besides quinine or salvarsan. He considers that endemic malaria of certain countries, as for instance in the South of Brazil, is resistant to quinine, perhaps because the natives of that country have been in the habit of taking that drug for many hundreds of years. As regards prophylaxis the author is in favour of small daily doses in preference to large weekly doses of quinine, his preference for the former being based on the ascertained fact that all the drug is excreted from the body by the third day.

P. H. Bahr.

Stephens (J. W. W.). **A New Malaria Parasite of Man.**—*Proc. Roy. Soc.* 1914. Apr. 8. Vol. B 87. No. B 596. pp. 375-377. With 1 coloured and 2 black and white plates; and *Ann. Trop. Med. & Parasit.* 1914. Apr. 21. Vol. 8. No. 1. pp. 119-124.

While examining a malarial blood film from the Central Provinces of India Stephens was struck by the peculiar appearance of the parasite, which he was inclined to regard at first as the malignant tertian parasite (*Plasmodium falciparum*). It exhibits the following peculiarities :—

1. It is extremely amoeboid (judging from the stained specimens).
2. The cytoplasm is scanty.
3. The nuclear protoplasm is out of proportion to the volume of the parasite.

It differs from *P. falciparum* in its amoeboid activity, and in the abundance and irregularity of nuclear matter; from *P. vivax* it can be distinguished by its smaller size, delicate nature of its amoeboid processes, the irregularity of its chromatin, and the rarity of typical ring forms. It is not certain whether the parasite enlarges the host cell, whether it is pigmented or not, or whether Schüffner's dots are produced. These points must remain unsettled till further material is forthcoming. Professor Stephens proposes to call the new parasite *Plasmodium pertenue.*

P. H. B.

MALOUVIER. **Une Epidémie de Paludisme au Tonkin.** —*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 745-752. With a map.

The cultivated delta of Tonkin has, up to the present, always held a healthy reputation as regards malaria, whilst in the elevated and thickly wooded regions the disease is endemic.

Researches of the last few years have shown that malaria is spreading into the plains and may appear in epidemics, such as one (caused by the subtertian parasite) which raged in the rich and fertile Province of Sontay throughout the months of May, June and July of 1913. The author believes that, though it seems paradoxical, the spread of malaria with increasing civilization and prosperity is due to improved transport, which, as in the case of trypanosomiasis, has facilitated the import of the infection into districts previously immune.

For the treatment of natives intramuscular injections of quinine were employed, a method to which the natives at first objected. Free distribution of quinine was ordered as a prophylactic.

[This report is of considerable scientific interest especially in reference to the epidemiology of malaria in the Himalayas and the Malay States; it is to be regretted that no information about the mosquito fauna is given.]

P. H. B.

BOUFFARD (Gustave). **De quelques Considérations d'Ordre épidémiologique sur le Paludisme.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 25-30.

Bouffard discusses the report by MALOUVIER, summarised above. In attempting to account for these epidemics of malaria in Tonkin the author stipulates for an over-production of gametocytes in the blood of recently infected natives and consequently for the infection of a proportionately larger number of anophelines than under normal circumstances. The malarial parasites of different countries, he thinks, exhibit different properties, such as in the rapidity of gamete formation, an observation which he has verified in French soldiers recently imported into Algiers and Morocco.

P. H. B.

MATHIS. **Considérations sur le Paludisme et la Filariose en Indochine.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 215-228.

The prevalence of malaria in the high lands of Indo-China as compared with the delta region is once more emphasized (see also above paper by MALOUVIER).

Blackwater fever appears to be fairly frequent and to have accounted for 12 per cent. of all European deaths from malaria during the last seventeen years. The author considers that undoubtedly malaria is the greatest scourge of this region. The results of a few investigations on the differential leucocyte count in native cases are recorded; there is no material divergence from the generally accepted malarial formula.

P. H. B.

JOUVEAU-DUBREUIL (H.). **Note sur le Paludisme à Tchentou (Setchouen, Chine occidentale).**—*Bull. Soc. Méd.-Chirurg. de l'Indochine.* 1914. Jan. Vol. 5. No. 1. pp. 32-37.

All known forms of malaria parasites are present at Tchentou. Though the subtertian forms 57·90 per cent of the total number of infections the author examined, it is interesting to note that cases of pernicious attacks appear to be extremely rare and no case of this description has ever been reported from Setchuen. The author believes an endemic hepatic cirrhosis to be a malarial complication. There is an annual fever season during the months of September, October and November, and no striking preponderance of any species of malaria parasite at any particular season of the year.

P. H. B.

DENEUFBOURG. **Paludisme observé dans le Corps d'Occupation de Chine [Chine du Nord].**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 53-63.

In North China the French army of occupation suffers considerably from malaria; in this paper it is stated that during the three months, August, September and October 1912, one hundred and twenty per thousand troops were invalided on that account; cases were especially numerous in the newly-enlisted Colonial troops.

The malarial season begins in August, though the anophelines are most numerous in June and July. The low temperature experienced in November (when the thermometer often records 9° C of frost) is responsible for many severe relapses.

Only one case of blackwater fever has been recorded, and in this instance the primary malaria infection was contracted elsewhere. No record is given of the indigenous species of parasite, but it is definitely stated that crescents have never been found.

P. H. B.

BROQUET (Ch.). **Paludisme et Culicides au Petchili.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 110-112.

Petchili in the North of China, six kilometres from Tien-Tsin, has two distinct seasons—a severe winter from November to April, and a hot season from May to September. The commonest anopheline mosquito is *Myzorhynchus sinensis*, whose eggs are capable of surviving a considerable degree of cold. The appearance of the adult mosquitoes in the summer is, according to Broquet, synchronous with an outbreak of benign tertian malaria. Beyond this one observation he has been unable to adduce any evidence that this particular species is capable of acting as a malaria carrier in that region. P. H. B.

LÉGER. **Recherches au Laboratoire de Bamako (Soudan Français). Sur l'Index paludéen, l'Index filarien, la Tuberculose et la Trypanosomiase humaine.**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 77-81.

To judge by figures given in this paper malaria must be extremely prevalent in the French Soudan. In a systematic series of 861 blood

examinations undertaken by Léger the parasite rate of 330 children under three years of age was found to be 94·65 per cent., and to be higher in the wet than in the dry season; the quartan parasite was by far the most widely distributed species; that double infections were only rarely met with (subtertian and quartan four times, subtertian and tertian once) is a remarkable fact.

Pyretophorus costalis is the most prevalent local anopheline.

[It is much to be desired that in papers of this kind a uniform scientific nomenclature of the malaria parasites could be adhered to; in the one under consideration the subtertian or malignant parasite is termed *Plasmodium praecox*, a name which was applied by Wasielewski in 1908 to the *Proteosoma grassii* Labbé 1894, and which has now by almost universal consent been superseded by that of *Plasmodium falciparum* Blan.]

P. H. B.

Brooke (Roger). **Concerning the Freedom of Cebu from Malarial Fever.**—*Military Surgeon.* 1914. Mar. Vol. 34. No. 3. pp. 201-204.

The town of Cebu in the Philippine Islands is free from endemic malaria. As far as is known, the topography and environment of the place are suitable to the existence and multiplication of anophelines, of which two species occur, *Myzomyia rossii* and *ludlowi*; the former is generally acknowledged to play no part in the transmission of the malaria parasite, the latter Brooke considers is incapable of serving as a definitive host for the parasite in Cebu.

[In view of Christophers's work on the part played by *M. ludlowi* in the spread of malaria in the Andamans, it would be well if these general observations were supplemented by experimental evidence.]

P. H. B.

Treatment.

Izar (G.) & Nicosia (R.). **Ueber Chemotherapie bei Malaria.**—*Berlin. klin. Wochenschr.* 1914. Mar. 2. Vol. 51. No. 9. pp. 385-391. and Mar. 9. No. 10. pp. 453-457. With 30 curves.

A therapeutic study on a series of 49 cases of malaria, undertaken in order to compare the effect of ethylhydrocuprein hydrochloride in doses of 1–1·5 grammes with that of similar doses of the bihydrochlorate of quinine; the intramuscular method of administration was employed throughout.

The authors elected to test this drug on man in consequence of Morgenroth's chemo-therapeutical researches on trypanosomes, in which the trypanocidal action of chinolin was found to be greatly augmented by the addition of an ethyl group as a side-chain.

They conclude that in benign as well as in the malignant infections, ethylhydrocuprein is much more efficacious than the bihydrochlorate of quinine. This superiority was especially noticeable in subtertian infections failing to yield to the latter drug. They lay special stress upon the constancy of its action, which suggests an affinity of the drug for the parasites in all stages of their development, and upon the rapidity with which they disappear from the peripheral blood.

No relapses occurred in the subtertian cases treated in this manner, though they were frequent enough in all six control cases treated with quinine bihydrochlorate alone. No symptoms of cinchonism were noted, and the patients themselves soon recognized the effects of the new drug and asked for it.

[The observations are open to one criticism; one gathers that the cases were partly studied from a travelling dispensary in the districts of Catania and Palermo, Sicily and on that account they could not be controlled as well as hospital patients. Those interested in this subject are referred to papers by GIEMSA and WERNER (see this *Bulletin*, Vol. 3, p. 257), and MACGILCHRIST, *loc. cit.*, p. 147.]

P. H. B.

CHRISTIN (E. F.). **Traitement arsenical d'un Cas de Purpura d'Origine probable Paludéenne.**—*Rev. de Méd. et d'Hyg. Tropicales.* 1913. Vol. 10. No. 4. pp. 208-211.

A case of purpura involving both the skin and mucous membranes and occurring in a chronic malarious subject who had marked anaemia and leucopenia. Injections of cacodylate of soda gave rise to large ecchymoses. All symptoms of malaria, and the purpuric patches as well, completely disappeared after a three weeks course of the arsenical waters of La Bourboule.

P. H. B.

PROPHYLAXIS.

IBBA (Ferruccio). **La Malaria nel Comune d'Iglesias durante il 1913.** —*Propaganda Antimalarica.* 1913. Dec. 31. Vol. 6. No. 5. pp. 132-139.

An account of the progress made in combating the effects of malaria in the commune of Iglesias, in Sardinia, in the year 1913. In a population of 22,000 inhabitants, partly urban and partly rural, a proportion of 4·2 per cent. were attacked by fever with a mortality of 1·5 per cent., or 14 deaths out of 924 cases. Of the 14 deaths 12 occurred in children and 2 in adults. The quinine distributed for prophylactic purposes amounted in round numbers to 45,000 grammes, or about 2 grammes per inhabitant; and in addition, about 9,000 grammes were used for the treatment of cases, or about 10 grammes per case.

J. B. Nias.

GENOVESE (Francesco). **La Patologia del Lavoro (Malaria) fra gli Operai Agrumari in Calabria.** [The Unhealthiness of Labour Conditions amongst the Fruit-Pickers of Calabria.]—*Propaganda Antimalarica.* 1914. Feb. 28. Vol. 7. No. 1. pp. 19-22.

Formerly the orange-harvest in Calabria did not begin till the opening days of the month of December, a time when all danger of malarial infection is practically over, but at the present time the exigencies of the foreign fruit-trade require that the picking of unripe fruit for export should commence in October, with the result that there is a good deal of malaria to be met with amongst the fruit-pickers, mostly

immigrants from neighbouring districts. It is suggested by the writer of this paper that these labourers should come provided with the necessary amount of quinine for self-administration during their stay, being supplied by their own local authorities, distribution on the spot being impracticable on account of the number involved. The conditions of housing and feeding amongst these migratory workers would seem to be deplorable.

J. B. N.

Rossi (Giacomo). **La Malaria nella Valle dell'Enza e l'Anofelismo senza Malaria.** [Malaria in the Valley of the Enza, and the Possibility of the Existence of Mosquitoes without Malaria.]—*Propaganda Antimalarica.* 1914. Feb. 28. Vol. 7. No. 1. pp. 1-11. With 4 text figs.

A discussion of the telluric conditions existing in the valley of the river Enza, a tributary of the Po, and their bearing on the prevalence of malaria. The author elaborates the favourite Italian theory that it is possible to get rid of malaria without getting rid of the mosquito.

J. B. N.

Brignone (Emiliano). **La Propaganda e Profilassi Antimalarica nelle Scuole Comunali di Terranova Monferrato durante l'Anno 1913.** [Antimalarial Propaganda and Prophylaxis in the Communal Schools of Terranova Monferrato during the Year 1913.]—*Propaganda Antimalarica.* 1914. Feb. 28. Vol. 7. No. 1. pp. 12-15.

Tarasconi (Luigi). **Profilassi Antimalarica Scolastica nell'Anno 1911 in Serramanna.**—*Ibid.* 1913. Dec. 31. Vol. 6. No. 6. pp. 139-141.

A local report of the type with which readers of this periodical are familiar. The children of the elementary schools of the district named received during the period extending from the 1st March to the end of June a tablet containing 20 centigrammes of quinine, three times a week, with the result that only one case of malarial fever occurred amongst 303 children.

Similar figures are given for Serramanna in Sardinia.

J. B. N.

Celli (Angelo). **La Malaria in Italia durante il 1911. Ricerche Epidemiologiche e Profilattiche.** [Malaria in Italy during 1911.]—*Propaganda Antimalarica.* 1913. Aug. 31. Vol. 6. No. 4. pp. 73-81 and Oct. 31. No. 5. pp. 97-106.

Professor Celli's annual report on the progress of the anti-malarial campaign in Italy. The methods adopted were the same as in former years. The tendency of expert opinion in Italy is to regard the extermination of the mosquito as a thing impossible of practical accomplishment under the local conditions prevailing, reliance being chiefly placed

upon the cinchonization of the population by means of quinine. How far this is an example to be followed elsewhere must remain an interesting question.

J. B. N.

ALLAIN (J.). **Paludisme et Quinine d'Etat en Annam pendant l'Année 1912.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 730-744.

This is apparently a Government report on the antimalarial administrative measures undertaken in Annam during 1913. Quinine, of which 100,000 tubes were sold in eight months, is readily taken by the natives.

For prophylaxis quinine sulphate is given daily in gradually increasing doses of from 25 cg. to 1 gramme, and in decreasing doses of the same ratio for the next few days; for curative treatment doses of 1 gramme daily for the first three, 75 cg. for successive three, 50 cg. for the 7th, 8th, and 9th, and 25 cg. for the 10th, 11th and 12th days, are considered sufficient.

P. H. B.

CULTIVATION.

BASS (C. C.). **Cultivation of Malarial Plasmodia in vitro.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Feb. Vol. 1. No. 8. pp. 546-564. With 4 plates.

In this paper Bass gives a summary of his own more recent work and that of others on this subject (see this *Bulletin*, Vol. 1., pp. 22–24; Vol. 2, pp. 9 and 10; pp. 224 and 225; p. 340; Vol. 3, pp. 58 and 59; p. 260).

With modification of the same technique ZIEMANN first succeeded in cultivating *Piroplasma canis* (see this *Bulletin*, Vol. 2, p. 224); latterly also BASS and JOHNS have noted a multiplication of *P. bigeminum*.

The technique for cultivation of one generation only of parasites is very simple, but to obtain further subcultures it is necessary to eliminate the ubiquitous phagocyte.

The apparatus and materials required.

1. Syringe and needle (Fig. 1, 1) for collecting the blood from a vein; an all-glass syringe of 20 c.c. capacity is convenient for the purpose. A coarse needle is necessary to prevent suction which alters the cells and kills the parasites in a short time.

2. Defibrinating tube (Fig. 1, 2) of 2½ cm. diameter and of a length suitable for the centrifuge. This tube is plugged with a cotton plug having a plain glass rod running through it and extending to the bottom. It has been found more satisfactory to substitute a glass tube for the glass rod, in which case the outer end is connected to a needle by means of a short rubber tube (Fig. 1, 3); this rubber can be dispensed with and a platino iridium needle welded directly into the tubing. Blood is collected by inserting the needle directly into a distended vein.

3. Culture tubes (Fig. 1, 4) not less than 1·25 cm. in diameter by 12·5 cm. deep.

4. Graduated pipette (Fig. 1, 10) 1 cc. graduated in hundredths.

5. Merck's dextrose 50 per cent. solution in water sterilized at 100° C. for three consecutive days.

6. Capillary pipettes (Fig. 1, 8) made from glass tubing of ·5 to ·6 cm. in diameter. Before sterilization the broader end should be plugged with cotton fitted with a rubber teat of the best quality.

7. The incubator should be regulated to a temperature of 40° C., though it is possible to use one at a temperature as low as 38° C. Sometimes the parasites grow well at a still lower temperature.

8. A centrifuge running at a speed of 800–2,000 revolutions per minute; higher speed centrifuges tend to destroy the parasites.

9. Culture tubes 12·5 cm. by 1·25 cm. with a flat bottom (Fig. 5) or (Fig. 6) provided with a disc of white filter paper supported from the bottom of the tube by a piece of glass tubing.

10. Plain pipettes (Fig. 1, 9) of a 5 to 20 cc. capacity of which the broader end is plugged with sterile cotton wool and the narrower end hermetically sealed.

11. A rubber tube 50 cm. long provided with a mouth piece and pinch cock (Fig. 1, 11). This tube should be of a proper size so as to fit on to the necks of the pipettes just described.

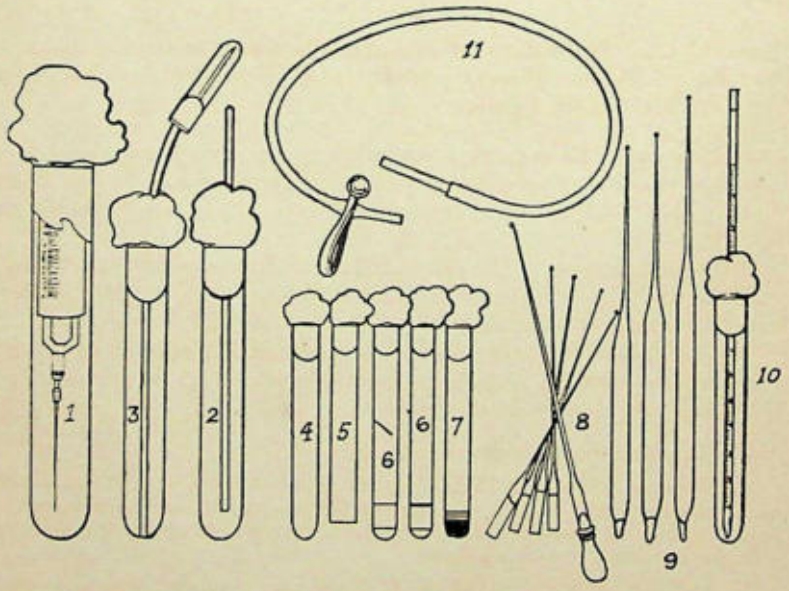


FIG. 1.

1. Syringe.
2. Defibrinating tube.
3. Defibrinating tube (with needle).
4. Culture tube (plain).
5. Culture tube (with flat bottom).
6. Culture tube (with paper shelf).
7. Culture tube with plasma in bottom.
8. Pipettes (small).
9. Pipettes (large).
10. Pipettes (graduated).
11. Rubber tube.

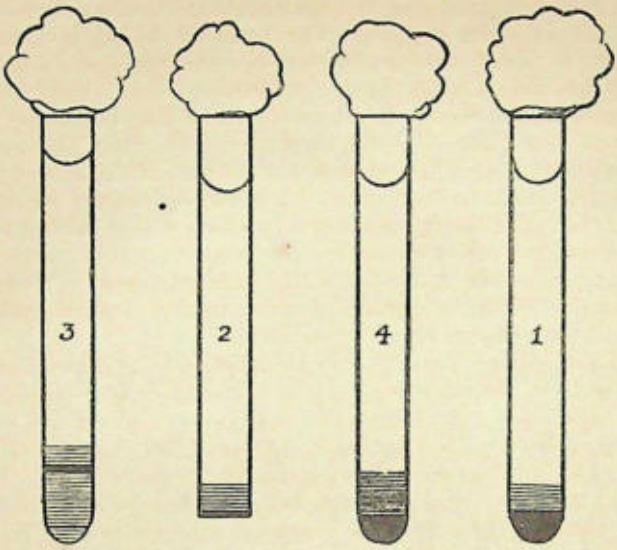


FIG. 2.—Culture on paper disk. Culture in flat bottom tube. Culture in plasma bottom tube. Ordinary form cultures.

Precautions. It is essential to sterilize all apparatus in a dry sterilizer; the addition of a few drops of water usually causes the death of the plasmodia. Care must be taken not to scorch the cotton plugs; the small amount of smoke thus produced suffices to kill all the parasites in a culture.

Technique employed for cultivation of one generation of parasites.—Blood is collected from the vein and expelled directly into the defibrinating tube; the latter should be tilted to one side to avoid unnecessary exposure to the air. One tenth of a cubic centimeter of the 50 per cent. dextrose solution is placed in the defibrinating tube for every 10 cubic centimeters of blood.

Defibrination is effected by whipping or stirring with the glass rod which extends through the cotton wool plug. The whipping in of air causing bubbles must be avoided. This defibrinated dextrose blood containing plasmodia may be transferred to other tubes or incubated in the original one; in any event the column of blood must be 2·5–5 cm. deep, yielding a column of serum of 1·25–2·5 cm. above the precipitated cells and parasites; should the supernatant serum be shallower the parasites tend to die out. Under the most favourable circumstances they only live and develop at the top of the column of precipitated cells and may be examined at any time by withdrawing a small amount of fluid by means of a sterile capillary pipette. Some considerable practice is required in order to do this without withdrawing cells and dead parasites situated beneath this layer at the same time. Care must be taken in handling tubes containing cultures to keep them in an upright position; tilting to one side results in burying and killing the living parasites at the top of the column of cells.

Technique employed for cultivation of more than one generation of parasites.—It is essential to remove the leucocytes at the time the

culture is made, in order to avoid destruction of the parasites by them at the time of segmentation. The malarial blood is centrifuged sufficiently to force the leucocytes to the surface; unnecessary centrifugation should be avoided.

The supernatant serum is drawn off into flat bottomed culture tubes: cells and plasmodia are carefully drawn from the middle of the centrifuged cells and planted at the bottom of the serum in these tubes: about one to two tenths of a cubic centimetre of cells in a half inch tube make the thickest layer in which it is possible to procure a homogeneous growth of parasites. By employing tubes with a paper disc suspended in them and filled with serum to at least 1·25 cm. above the level of the disc it is possible to secure a growth of parasites in about twice the amount of cells already mentioned.

By employing coagulated human blood plasma with the addition of 1·25 cm. of fresh dextrose serum, over the surface of which cells and parasites from the centrifuged and defibrinated blood are carefully distributed, a layer of live parasites ·25 cm. thick may be obtained; generally the parasites die out after the first segmentation. In order to obtain further cultures it is necessary to transfer a portion of the cells and parasites to a recently prepared tube containing fresh cells and serum. This transplantation should be done within four or five hours of the time of maximum segmentation.

Influence of dextrose in cultures.—Attempts made to grow the parasites without the addition of dextrose have always failed: the protoplasm of the parasite rapidly degenerates. Dextrose added to these cultures fails to revive them. Maltose is the only sugar which can act as a substitute for dextrose, though it is by no means certain whether it does so *per se* or whether it acts by being first converted into dextrose. Should haemolysis be produced the infected cells haemolyse first and the parasites die out. So essential is dextrose that blood removed from a subject after a full meal affords a much more suitable medium than that of the same person withdrawn while fasting, though when present in too high a proportion it delays the growth of the parasites. It was found that plasmodia will develop in the presence of media other than blood serum. Both the tertian and the subtertian parasite will grow feebly in Locke's fluid without the addition of calcium chloride, and also in different ascitic fluids, of course in both cases with the necessary addition of human erythrocytes; being unable to exist even for a few minutes free in the serum they cannot grow independently of the cells. The leucocytes are capable of ingesting the free merozoites only and not the intracellular trophozoites.

Bass believes, as a result of numerous observations on plasmodium growing *in vitro*, that *in vivo* they can only pass from cell to cell when one is in direct contact with another containing a segmenting parasite, and then only when the opening for the exit of merozoites occurs opposite the cell to be infected. The protoplasm of the parasites is of a firmer consistency than that of the red cell and as a result of this feature they are capable, after having attained a sufficient size, of lodging and remaining fixed in the capillaries, wherever the current is weakest: here segmentation takes place. Considered in this light plugging of the capillaries to a degree sufficient to produce coma becomes intelligible. The haemolysing effect of calcium salts on

cultures of the subtertian parasite *in vitro*, which Bass has recently substantiated as a result of his experiments, and which exerts no such influence on normal blood, may yet provide the key to the pathogenesis of malarial haemoglobinuria

P. H. B.

Nocht (B.). **Bemerkung zu der Arbeit von Prof. Ziemann "Weiteres über die Züchtung der Malariaparasiten und der Piroplasmen in vitro."** (Archiv für Schiffs- und Tropenhygiene, Bd. 18, Heft 3). [Remarks on the Work of Prof. Ziemann "On the Cultivation of Malaria Parasites and Piroplasmata in vitro."]—*Arch. f. Schiffs.- u. Trop.-Hyg.* 1914. Mar. Vol. 18. No. 5. pp. 166-167.

Da Rocha-Lima and Werner have asserted* that Nocht had succeeded many years ago in obtaining a multiplication of schizonts in vitro. Though admitting the truth of this assertion Nocht states that he did not consider his work worthy of publication at the time, as he did not succeed in cultivating the parasites for more than one generation.

P. H. B.

Suldey (E. W.). **Importance de la Formule leucocytaire dans le Diagnostic différentiel de l'Hépatite paludéenne et de l'Hépatite suppurée.**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 71-77.

The conclusions of this paper may be stated as follows :—

(1) A more or less accentuated leucocytosis denotes a hepatic suppuration, unless some other obvious septic focus exists.

(2) A neutrophile hypoleucocytosis associated with an evident mononuclear leucocytosis denotes a malarial hepatitis.

P. H. B.

**Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Vol. 17. p. 541.

BLACKWATER FEVER.

BOYÉ (L.). **Relations entre la Consommation de la Quinine et la Fréquence de la Fièvre Bilieuse Hémoglobinurique au Tonkin.**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 68-71.

An analysis compiled from official malaria and blackwater fever returns among the 7,990 European and 11,150 native Colonial troops employed in Tonkin during the last twelve years, with special reference to the compulsory quinine prophylaxis during the last eight years.

From these returns it was possible to construct a table showing the frequency of the disease and death rate from this cause per 1,000 (European and native troops).

Years.	Europeans.		Natives.	
	Morbidity per 1000 effectives.	Mortality per 100 cases.	Morbidity per 1000 effectives.	Mortality per 100 cases.
1902	2·0	35·0	6·7	34·5
1903	3·3	35·2	7·2	31·3
1904	2·4	34·6	6·0	19·2
1905	4·6	18·4	5·5	8·5
1906	·8	42·8	5·3	31·2
1907	·5	33·3	6·2	11·1
Mean	2·2	33·2	6·1	22·6
1908	2·1	42·8	2·6	30·7
1909	·9	0·0	5·5	38·4
1910	3·0	9·0	8·0	12·1
1911	·3	0·0	5·9	12·5
1912	·5	25·0	8·0	19·7
1913	·1	0·0	3·4	12·1
Mean	1·1	12·8	5·5	20·9

The case incidence amongst Europeans has fallen within the periods 1908–1911 to one half and the death rate by 20·4 per cent. of the figure for the previous seven years; amongst the native troops, however, the improvement has by no means been so uniform. More striking than the malaria reduction is the diminution in the amount of blackwater fever which has taken place since this compulsory quinine prophylaxis has been introduced, in spite of active military operations involving physical strain and exposure (factors which, as is well known, predispose to blackwater fever) which the troops under consideration have had to undertake during the last six years.

The author deduces from a study of these figures that in Tonkin at

least quinine may be definitely excluded as an aetiological factor in the production of blackwater fever [see also papers by MALOUVIER and ALLAIN].

P. H. B.

BIJON. **Quelques Résultats Expérimentaux au Sujet de la Pathogénie de la Fièvre Bilieuse Hémoglobinurique.**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 64-68.

A record of a few, not very convincing, experiments on rabbits, undertaken in order to test in vitro the corpuscular resistance to dehaemoglobinization after previous injections with quinine.

The conclusions may be stated shortly as follows:—the haemolytic action of quinine is only manifest for a few days after the injection. It is probable that some anti-haemolytic body is produced in the serum, but should quinine be injected during a period in which this substance is either absent or has been completely absorbed from the blood stream, haemoglobinuria will result. This hypothetical body is but slowly produced, with the result that the corpuscular resistance to dehaemoglobinization is diminished as long as eleven or twelve days after the last quinine injection.

P. H. B.

SOERENSEN (N.). **Die Urobilinsekretion im Harne bei Malaria, besonders beim Schwarzwasserfieber.** [The Secretion of Urobilin in Malaria and especially in Blackwater Fever.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Mar. Vol. 18. No. 5. pp. 159-163.

Soerensen has continued PLEHN's work on this subject* in the Island of Flores, one of the Sunda Islands. Of the malaria parasites found in the island, the subtertian and quartan are the most abundant. Schlesinger's test for urobilin (zinc acetate in alcoholic solution and iodine in potassium iodide solution) was employed; a green fluorescence denotes a positive reaction. The author believes that urobilin can be quantitatively estimated in a rough manner by progressive dilution of the urine and by watching the intensity of the spectroscopic bands.

Two or four days after defervescence of fever the reaction was no longer present, though its reappearance invariably presages a relapse; in one case it was noted in especially large quantities twenty-four hours before the onset of blackwater.

This observation he applied to other cases and was thereby enabled to foretell the onset and to forewarn the patient of blackwater in fifteen instances; and sometimes, he believes, by promptly applying a vigorous quinine treatment, was enabled to ward off the attack.

P. H. B.

*PLEHN (A.). The Diagnosis of Latent Malaria.—*Brit. Med. Jl.*, 1908. Oct. 31. p. 1357.

PATTON (Walter Scott). [M.B. (Edin.), I.M.S.] & CRAGG (Francis Wm.) [M.D. (Edin.), I.M.S.]. **A Textbook of Medical Entomology.** —xxxiii+764 pp. cr. 8vo. with 89 plates. 1913. London, Madras & Calcutta; Christian Literature Society for India. [£1-1*s.* net. or Rupees 15-2 net.]

The most original features of this encyclopaedic work are manifested in its conscientious anatomical descriptions, and in its attentive and instructive treatment of methods of breeding and manipulation of insects in the laboratory; these give it its essential character as a sound book of reference for those who wish to investigate experimentally the natural history of insect-borne disease. Both actual and potential agents of infection are included, the groups considered being the *Chironomidae*, *Simuliidae*, *Psychodidae*, *Culicidae*, *Tabanidae*, *Muscidae*, and Pupipara, among Flies; the Fleas; the *Rhynchota* and Lice; the Ticks, and to a limited extent the Mites; the *Linguatulida*; and *Cyclops*. Each group is treated systematically and comprehensively in its particular pathogenic relations; external characters, both larval and adult; habits, habitat, and life-history; incidence, seasonal prevalence, etc.; classification and generic and specific composition; internal structure and methods of dissection; collection and preservation; and breeding and maintenance for laboratory requirements. The Classification includes tables and catalogues for the recognition of genera and species, and descriptions and notable particulars of all species of acknowledged pathogenic significance; and the accounts of internal structure always comprise a critical exposition of the mouth-parts and of all those structures and organs that are in any way implicated in the process of acquiring, harbouring, and transmitting infection; while to every group a useful bibliography is appended. Where the work goes beyond this well-conceived and well-executed programme it has some vulnerable points. This is particularly so among the first 150 of its 745 pages, which are occupied with a long account of the comparative anatomy—with an occasional diversion into phylogeny—of blood-sucking Diptera as a whole. These 150 pages certainly teem with interesting and pertinent facts; but they are rather too much permeated with interpretations and ingenious speculations, and even with assumptions that, however elevating, are somewhat out of place in a treatise on applied entomology. A certain amount of well-sifted speculation gives salt and savour to any text-book; but the critical reader will always reflect that in comparing the fully-formed structures of adult animals the most contradictory hypotheses can be supported by the same facts, and that theories of homology and of phyletic precedence that are not founded on verifiable facts of development are not capable of bearing a lasting strain, however plausible they may appear.

In the explicitly technical part of the book the authors introduce a large amount of original work. This is evident in the pages on the blood-sucking *Muscidae*, where also attention is directed particularly to the species of *Musca* which, though not furnished with any special means of drawing blood, yet are habitually haematophagous, getting their fill by playing jackal or bully to the truly mordacious species of their own and other families. Even when they traverse ground that is not altogether unfamiliar to entomologists the authors have much to communicate in the way of confirmation, emendation, and amplification, particularly in their careful accounts of the anatomy of *Tabanus*, *Conorhinus*, *Cimex*, and *Pediculus*.

Nearly 90 pages are allotted to the Mosquitoes, where the authors do not commit themselves definitely to any particular scheme of classification. Brief diagnoses are given of almost all the known species of *Anopheles*, in a convenient geographical arrangement. The species of *Anopheles* known or reputed to be natural carriers of malaria are treated with proper emphasis, and the characteristic features of the larvae—so far as they are known—are distinguished.

In the account of the *Tabanidae* novel and valuable directions for collecting and rearing larvae are given.

In the chapter on *Rhynchota* the authors go a little off the track—possibly with an eye to the pursuit of flagellates that are harboured by various

species of plant-bugs—to bring in a synopsis, taken from DISTANT'S volume in the *Fauna of British India*, of all the constituent Oriental families of the order. The blood-sucking genus *Conorhinus* is treated in commendable detail, but one must inquire why the authors have changed the good name *Conorhinus sanguisuga* to *sanguisugus*; *sanguisuga* is a feminine noun substantive, meaning a leech; an adjective *sanguisugus* is non-existent, and is non-consistent with the regulations of Latin grammar.

More than 100 pages are devoted to the Ticks, the dissection of these parasites, and the methods of breeding them and of manipulating them for experimental work being described in great detail.

There is a useful chapter on laboratory technique—dissection, section-cutting, mounting, etc. For decolourising chitin the authors do not notice the use of peroxide of hydrogen—which is generally regarded as the simplest method.

The illustrations are abundant and adequate, filling 89 large plates. The original drawings must be of superlative excellence, as is evidenced by those plates—e.g. xl-xlix and the plates of *Anopheles*—in which they have been artistically reproduced, but justice has not been done to them in many of the reproductions, which are of coarse and heavy texture.

The authors seem to the reviewer to be unnecessarily sarcastic in styling a colleague who attends to the specific characters of mosquitoes a "culicidologist." Nor is it intelligible why if *Stomoxys* and its relatives are to be isolated in a subfamily, that subfamily should be called *Stomoxydinae*; unless, indeed, it be argued that as the name *Stomoxys* is an unusual compound it has no established claim to respect.

Small specks on the surface, however, do not dim the general lustre. In the words of its sponsor, the book "will be extremely useful to all workers in Medical Entomology, and I trust that it will meet with the success which it undoubtedly deserves."

A. Alcock.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 3.] 1914. [No. 9.

AMOEBIASIS AND DYSENTERY.

Amoebiasis.

Ujihara (K.). **Studien über die Amöbendysenterie.** (1. Mitteilung). —*Zeitschr. f. Hyg. u. Infektionskr.* 1914. Apr. 1. Vol. 77. No. 2. pp. 329-355. With 1 plate.

A collection of short studies on amoebic dysentery as it is met with in Formosa; the author's principal conclusions are as follows:—

1. The type of amoeba met with in Formosa is *A. tetragena* Viereck. It occurs in the active or vegetative stage, in two forms which may be called the histolytica- and the tetragena-form; but the cysts are always of the recognised tetragena type. Three degenerative forms can also be distinguished, differing by their mitosis. The occurrence of such degeneration forms in the stools of the patient is, clinically, of good augury.

2. The cysts, outside the body, will preserve their vitality for a month, if protected from sunlight; and can stand warming to a temperature of 50° C. for 30 minutes for four successive days without being killed. They are strongly resistant to acids, but not to alkalies. Quinine, bile and other lipoid-dissolving substances have a dissolving action on the capsule; so has trypsin, but not gastric juice.

3. The specific gravity of such cysts, as determined with mixtures of glycerin and water of varying density, seems to be 1065.

4. Combinations of quinine with tannin are the best remedial agents in the vegetative stage of the amoeba, the tannin delaying the absorption of the quinine until its arrival at the lower part of the alimentary canal. For the expulsion of cysts on the other hand thymol and oil of male fern are the best remedies.

S. R. Douglas.

James (W. M.). **Report of a Case of Infection with** *Entamoeba tetragena.*—*Proc. Canal. Zone Med. Assoc. for the Half-Year April to Sept. 1912.* Vol. 5. Pt. 1. pp. 46-52.

A report of a case of dysentery observed in 1912 in which *Entamoeba tetragena* was found. Most of the paper is taken up with a discussion of the differences between the various entamoebae. [The more recent

publications of the author as well as of investigators in other parts of the world have brought the problem discussed so much nearer solution that it does not appear necessary to abstract the paper more fully.]

S. R. D.

MATHIS (C.). **Les Porteurs de Kystes de *Löschia histolytica* et la Prophylaxie de la Dysenterie Amibienne.**—*Bull. Soc. Méd. Chirurg. de l'Indochine.* 1913. Dec. Vol. 4. No. 10. pp. 474-481.

This important paper deals with the rôle of parasite-carriers in amoebic dysentery. The author states that *Löschia* (*Entamoeba*) *histolytica* is the sole cause of amoebic dysentery, the other species from the human intestine being doubtful, insufficiently characterised, or belonging to the free amoebae. While further research is needed on the duration of vitality of the four-nucleate cysts of *L. histolytica*, it seems likely that even encysted forms do not retain their vitality for long outside the human host. Two classes of carriers of dysenteric amoebae are recognised :—(1) Convalescent patients who still discharge cysts ; (2) healthy carriers of *L. histolytica*. The latter are the more dangerous, as they produce large numbers of the infective cysts in their faeces, without any clinical manifestations being present. At Tonkin, Mathis found that 8 per cent. of the natives examined by him—a limited number he says—were thus functioning as healthy carriers of dysentery.

The natural method of infection is by the mouth, either by contact of the hands with the germ carriers or by the ingestion of drinking water or vegetables recently contaminated by human dejecta. Mathis believes that direct, inter-human contagion is as important as the indirect infection by food or drink. He points to evidence in favour of his opinion, afforded by the absence of dysentery among the troops when in barracks, and its sudden appearance under the more crowded conditions of camp life, and also the frequency of fatal dysenteric attacks among doctors and nurses incurred during the exercise of their duties.

Great care must be exercised with regard to food and drinking water. The disinfection of the dejecta of all sufferers from intestinal complaints is necessary. Direct contamination must be avoided. The hands should be washed frequently and especially before meals. Antiseptics should be added to the dejecta of all suspects. A systematic search for the carriers of dysenteric amoebae is useful, but is not indispensable, but an amoebic index enables one to judge of the degree of danger.

H. B. Fantham.

LANDOUZY (L.) & DEBRÉ (Robert). **Les "Porteurs de Germes" Importateurs de Maladies exotique particulièrement de la Dysenterie Amibienne.**—*Bull. Acad. Méd. Paris.* 1914. Séance du 24 mars. 3 ser. Vol. 71 (78 année). No. 12. pp. 439-459. With 3 figs. [With discussion]. Also published without discussion in *Presse Méd.* 1914. Mar. 25. No. 24. pp. 229-232.

This paper deals with amoebic dysentery occurring in individuals who have never left France.

The authors give the detailed account of a case of this sort who developed a liver abscess, which resulted in his death; very full notes of the post mortem examination are given, including the histological changes found in various lesions.

From the examination of the literature the authors collected accounts of 13 other cases with a similar history, and point out the danger that sufferers from chronic dysentery contracted in the tropics may be to the inhabitants of Europe.

They show clinicians practising in France that, as such cases do occur, the fact that the patient gives a history of never having left France does not exclude the possibility of his disease being amoebic dysentery.

S. R. D.

VEDDER (Edward B.). **Origin and Present Status of the Emetin Treatment of Amebic Dysentery.**—*Jl. Amer. Med. Assoc.* 1914. Feb. 14. Vol. 62. No. 7. pp. 501-506.

In this paper, which is an excellent and most impartial description of the subject, the author gives a very complete account of the earlier use of emetine for the treatment of dysentery. He then deals with his own experiments showing the amoebicidal action of emetine and ipecacuanha, which were confirmed by WHERRY.

Referring to ROGERS'S work, while giving him full credit for the method of administration of emetine subcutaneously and pointing out the extreme usefulness of this discovery, he draws attention to the fact that the often quoted experiments of ROGERS on the action of the drug on *E. histolytica* in stools are quite without significance, as these amoebae soon lose their motility and degenerate even under the most favourable circumstances. He then passes on to review the various reports of the favourable results obtained by this treatment, sounding a note of warning against the use of very large doses, especially by intravenous injection, and sums his paper up in the following conclusions :—

"1. Emetine is a true specific in amebic dysentery and hepatitis.

"2. The hypodermic use of the hydrochlorid salt is the preferred method of treatment.

"3. A large percentage of the cases so treated continue to harbour *E. histolytica* in the faeces for some time.

"4. While in view of this fact it is impossible to state at present that patients treated by emetine will remain permanently cured, yet the prospects of obtaining permanent cures by this method are encouraging.

"5. The presence of a considerable number of these chronic ameba carriers constitutes a sanitary menace to the community.

"6. It is possible that the amebas may be removed from these carriers by a course of irrigations of quinine or silver nitrate.

"7. Experiments have failed to show that emetine possesses any marked therapeutic virtue in bacillary dysentery, syphilis, rabies or trypanosomiasis."

S. R. D.

i. BETTS (A. J. V.). **Emetine and Dysentery.** [Correspondence.]—*Indian Med. Gaz.* 1914. Mar. Vol. 49. No. 3. p. 124.

ii CARTER (R. Markham). **Emetine and Ipecacuanha; their Amoebacidal Value in Pathogenic Amoebiasis.**—*Ibid.* pp. 109-112.

iii. Chaterji (K. K.). **Emetine in Hepatitis and Amoebic Abscesses of the Liver and Spleen.**—*Ibid.* pp. 108-109.

iv. Hooton (A.). **The Emetine Treatment of Dysentery and Allied Liver Conditions in Kathiawar.**—*Ibid.* pp. 116-117.

v. Hudson (C. T.). **Notes on the Employment of Emetine in the Dharwar District.**—*Ibid.* pp. 117-118.

vi. Maddock (E. C. G.). **A Note on Three Cases treated with Emetine.**—*Ibid.* p. 118. With a chart.

vii. Munro (D.). **Emetine in Amoebic Dysentery.**—*Ibid.* pp. 103-106.

viii. Newman (E. A. R.). **The Operative Treatment of Hepatic Abscess.**—*Ibid.* pp. 97-101.

ix. Nott (A. H.). **Emetine and Liver Abscess.**—*Ibid.* pp. 101-103.

x. Sandes (John D.). **Treatment of Liver Abscess.**—*Ibid.* pp. 107-108.

xi. Seal (C. Baldwin). **Note on Amoebic Dysentery in the Darjeeling District and its Treatment.**—*Ibid.* pp. 106-107.

xii. Thurston (E. Owen). **A series of 101 Cases of Abscess of the Liver.**—*Ibid.* pp. 88-96.

xiii. Rogers (Leonard). **The Emetine and other Treatment of Amoebic Dysentery and Hepatitis including Liver Abscess.**—*Ibid.* pp. 85-88.

xiv. Whitmore (A.). **An Experience in the Use of Emetine in the Treatment of Amoebic Dysentery.**—*Ibid.* pp. 112-116.

The above papers appeared in a number of the *Indian Medical Gazette* entirely devoted to the question of the treatment of amoebiasis by emetine.

Reviewing the papers collectively two points are especially noticeable :—

1. With a single exception, all the authors are very favourably impressed with the treatment of both dysentery and hepatitis by subcutaneous injections of emetine.

2. With regard to liver abscess, the majority of the authors, and these include those with the largest experience, are strongly of the opinion that repeated aspiration, combined with subcutaneous injections of emetine, is the best and safest treatment.

The following are short abstracts of the individual papers :—

i. A letter in which the author states that, having treated a series of ten cases of dysentery with emetine with no improvement but with immediate improvement after the administration of ipecacuanha in 30 grain doses, he is strongly of the opinion that the ipecacuanha treatment is superior to the emetine.

ii. A somewhat confused paper in which the author, judging from the treatment of 168 cases of amoebiasis, gives a verdict strongly in the favour of the emetine treatment, especially in cases of dysentery and hepatitis. In cases of liver abscess, however, he is of the opinion that incision and drainage is all that is necessary and should always be adopted. A large part of the paper consists of theoretical considerations, given in extremely polysyllabic verbiage, as to the method of penetration of the amoebae into the body and the channels by which they reach the various organs.

iii. The author has used the emetine treatment only in the more severe type of cases such as:—(1). Dysentery with pericolitis; (2). Presuppurative hepatitis; (3). Liver and splenic abscess.

The impression gained from the treatment of such cases has been very favourable. With regard to operative treatment employed for the evacuation of pus from amoebic abscess, the author strongly advocates aspiration whether the abscess is situated in the liver or spleen; two cases of the latter type are reported.

iv. Notes of the treatment of four cases, all of which recovered.

v. An account of six cases treated successfully with emetine; the author's usual practice is to employ emetine in those cases which fail to respond to ipecacuanha.

vi. Notes on three cases treated with emetine with favourable results.

vii. The author attempts to deal statistically with a small number of cases treated by emetine injections with the usual disappointing results. The impression, however, that he gained from the observation of these cases was very favourable to emetine treatment, especially in cases of hepatitis.

viii. The author, from the observation of 25 cases of liver abscess, concludes that exploration by aspiration is a dangerous and unreliable method and recommends exploration by incision in such cases; apparently, however, having read papers by THURSTON and ROGERS on the treatment of liver abscess by aspiration combined with subcutaneous injections of emetine, he is inclined to modify his views. His opinion of the emetine treatment of the presuppurative stages of hepatitis is very favourable. A detailed account of the operative measure undertaken to locate and evacuate such abscesses is given.

ix. Notes on two cases of liver abscess. In the author's opinion the best treatment for such cases is aspiration of the pus combined with emetine subcutaneously. In very few cases, and only those where the abscess is small and the skin involved, is open incision preferable.

x. The author bases his conclusions on the study of 32 cases of liver abscess, many of which were in a very bad condition. The treatment recommended is aspiration with presumably subcutaneous injections of emetine. In very severe cases no general anaesthetic should be employed.

xi. From the study of 70 cases the author concludes that emetine is a specific for amoebic dysentery. Concerning dosage he recommends that at least two-thirds of a grain should be given daily.

xii. An instructive paper on liver abscess compiled from the author's own notes. Amongst the points elucidated are:—

(1). *Sex incidence.* 97 of the cases occurred in males, only 3 in females.

(2). *Average age* of the cases was 34·5 years.

(3). *Caste.* Hindus 85, Mohamedans 10, Europeans and Anglo-Indians 6.

(4). *History of dysentery.* This was enquired into in 79 cases, 44 of which gave a positive history, 35 a negative one.

(5). *Alcoholism.* A history of this condition was sought for in 75 cases, of which 42 gave a history of varying degrees of excess and 33 denied excessive indulgence.

(6). *Geographical distribution.* The disease in the author's experience was commonest in lower Bengal.

With regard to treatment the author very strongly advocates the practice of aspiration of the pus, combined with the subcutaneous injection of emetine, 1 grain of which is administered immediately before the aspiration. A table is added giving the most important features of each case.

xiii. The author records the results of some experiments on the comparative toxicity of cephaelin and emetine hydrochlorides on paramoecia, which showed that emetine is the more active substance. Cultures of paramoecia were used, as the author was unable to obtain cultures of amoebae.

The next section of the paper deals with the clinical results obtained by treating cases of dysentery with a mixture of the alkaloids obtained from ipecacuanha; the author's opinion is that the mixed alkaloids gave less striking results than when emetine alone was used. Experiments are also recorded carried out to determine the lethal dose of emetine hydrochloride, rabbits and monkeys being the animals used. Assuming that man would be proportionately affected, the lethal dose for a man of 70 kilogrammes would be 15 grains, if the drug were given hypodermically, and 5 grains if given intravenously. The paper is concluded with some remarks on the treatment of hepatitis and liver abscess; for the latter condition aspiration is strongly recommended.

xiv. The author records the result of emetine treatment in 34 cases. Although four of these died he satisfactorily shows that the cause of death was other than dysentery, and in those cases where post-mortem examinations were obtained the dysenteric lesions were found to be in a healing state. Relapses after apparent cure were by no means uncommon. The author draws attention to the danger of failing to recognise cases of mixed bacillary and amoebic infections, and illustrates this point with the notes of three cases. S. R. D.

ALLAIN (J.). **Emploi du Chlorhydrate d'Emétine dans les Amibiases par les Médecins du Corps de Santé des Troupes Coloniales.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 723-730.

ALLAN (William). **Progress Report on the Use of Emetine in Amebic Dysentery.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Feb. Vol. 1. No. 8. pp. 565-572.

ALOY (Alberto Correa). **Del Chlorhidrato de Emetina en el Tratamiento de la Disenteria por las Amibas.**—*Revista Med. de Yucatan.* 1913. Dec. Vol. 9. No. 2. pp. 25-27.

ANNALES D'HYGIÈNE ET DE MÉDECINE COLONIALES. 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 236-240. **Hôpital de Hanoï. Le Chlorhydrate d'Emétine dans les Hépatites suppurées.** [Clinique d'Outre-Mer].

BELL (J.). **Note of a Case of Liver Abscess treated without Operation.**—*Jl. Trop. Med. & Hyg.* 1914. Feb. 2. Vol. 17. No. 3. p. 33.

BRAU. **L'Emétine à l'Hôpital de Saïgon (Cochinchine) iv.** [Clinique d'Outre-Mer]. *Ann. d'Hyg. et de Méd. Colon.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 1133-1150.

BRELET (M.). **Traitement de la Dysenterie Amibienne, de l'Hémoptysie et des autres Hémorragies par l'Emétine.**—*Gaz. des Hôpit. Civils et Militaires.* 1913. Dec. 23. Vol. 86. No. 146. pp. 2318-2320.

CHAUFFARD (M. A.). **Etat hémop oïque chronique, consécutif à l'Ouverture dans les Bronches d'un Abcès Dysentérique du Foie. Guérison par l'Emétine.**—*Bulls. et Mémes. Soc. Méd. des Hôpit. de Paris.* 1914. Jan. 22. 3e Ser. 30e Ann. No. 2. pp. 29-34.

CHAUFFARD. **Les Rechutes de la Dysenterie Amibienne et leur Traitement.**—*Jl. des Praticiens.* 1914. Jan. 17. Vol. 28. No. 3. pp. 39-40.

DOPTER (Ch.). **Amibiase et Emétine.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 142-152.

EUSTIS (Allan). **Report of a Case of Long-standing Amebic Abscess of Liver and Lung. Cured by the Intramuscular Injection of Emetine Hydrochloride.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Jan. Vol. 1. No. 7. pp. 520-523.

GAIDE (J.) & MOUZELS (P.). **Note sur le Traitement de l'Abcès du Foie d'Origine Amibienne par l'Emétine.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et de Méd. Colon.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 1150-1155.

GAIDE (L.) & MOUZELS (P.). **Note sur le Traitement des Abcès du Foie par l'Emétine.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 716-723.

GREER (Alvis E.). **Amoebic Dysentery treated with Emetine.**—*Texas State Jl. of Med.* 1913. Dec. Vol. 9. No. 8. p. 254

GUILLEMET. **Dysenterie Amibienne traitée sans succès par l'Emétine.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et de Méd. Colon.* 1913. Oct.-Nov-Dec. Vol. 16. No. 4. pp. 1115-1118.

HARTSOCK (Frederick M.). **Emetine in Dysentery.**—*Military Surgeon.* 1913. Dec. Vol. 33. No. 6. pp. 517-521.

DE JONGE (G. W. Kiewiet). **Aanteekeningen over 25 met Emetine behandelde Gevallen van Amoben-dysenterie.** [Remarks on 25 Cases of Amoebic Dysentery treated with Emetine.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 6. pp. 842-868.

KELLY (W. D. G.). **Notes of Some Interesting Cases.**—*Jl. R. Army Med. Corps.* 1913. Dec. Vol. 21. No. 6. pp. 688-692.

MARTEL. **L'Emétine à l'Hôpital de Saïgon (Cochinchine).** i. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et de Méd. Colon.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 1118-1122.

MAURRAS & HERVIER. **L'Emetine à l'Hôpital de Saïgon (Cochinchine).** iii. [Clinique d'Outre-Mere.]—*Ibid.* pp. 1128-1133.

MCCASKEY (G.W.). **A Case of Amebic Dysentery of Thirteen Years' Duration Cured by Emetine Hydrochloride.**—*Jl. Amer. Med. Assoc.* 1914. Feb. 14. Vol. 62. No. 7. pp. 534-555.

MEDICAL MISSIONS IN INDIA. 1913. Oct. Vol. 19. No. 75. pp. 169-170. **Note on the Value of Emetine in the Treatment of Amoebic Dysentery.** [E.F.N.].

NOGUÉ. **L'Emétine à l'Hôpital de Saïgon (Cochinchine). ii. Cas où Les Injections de Chlorhydrate d'Emétine ont eu une Action Curative Evidente.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et de Méd. Colon.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 1122-1127.

PEPIN (Jules). **Deux Cas de Dysenterie Amibienne traités et guéris par l'Emétine.**—*Bull. Soc. Méd. de l'Ile Maurice.* 1913. Oct.-Nov.-Dec. Vol. 31. 2 Ser. No. 34. pp. 63-64.

PHILLIPS (L.). **Le Traitement spécifique de la Dysenterie Bacillaire avec une Notice sur l'Emploi du Chlorhydrate d'Emétine dans la Dysenterie Amibienne.**—*Rev. Méd. d'Egypte.* 1913. Oct. No. 10. [6 pp.]

ROSIER (Ch.). **Un Cas d'Abcès du Foie post-dysentérique. Opération et Traitement au Chlorhydrate d'Emétine.**—*Presse Méd. Belge.* 1914. Feb. 1. Vol. 66. No. 5. pp. 75-78.

SEGUIN. **Quelques Observations de Dysenterie traitée par l'Emetine.** [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et de Méd. Colon.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 1155-1161.

WAGNER (Jerome). **Report of Cases of Amebic Dysentery treated with Emetine.**—*Med. Record.* 1914. Jan. 31. Vol. 85. No. 5. pp. 190-194.

WEBB (Vere C.). **Amoebic Dysentery?**—*Lancet.* 1914. Jan. 3. pp. 74-75.

WERNER (H.). **Emetin bei Amöbendysenterie.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1914. Mar. Vol. 18. No. 6. pp. 206-210.

YEOMANS (Frank C.). **Amebic Dysentery. With Special Reference to its Treatment with Emetine.**—*New York Med. Jl.* 1914. Feb. 14. Vol. 99. No. 7. pp. 327-331.

All the above papers deal with the treatment of amoebiasis with subcutaneous injections of emetine and the conclusions come to by all these authors is that the treatment is extraordinarily beneficial.

Several draw attention to the occurrence of relapses after this treatment, and some give a more or less complete summary of the literature of the subject.* S. R. D.

JAMES (W. M.). **The Effects of Certain Drugs on Pathogenic Entamoebae of the Human Intestines. With Special Reference to the action of Bismuth subnitrate in large doses and to the Hypodermic Injection of the Hydrochloride of Emetine.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1913. Dec. Vol. 1. No. 6. pp. 431-446. With 1 plate.

The first part of this paper is concerned with a discussion of the various treatments for amoebic dysentery and especially the administration of large doses of bismuth subnitrate and the subcutaneous injection of emetine salts, and the author puts forward several hypotheses as to how these drugs may attack the amoebae causing the disease.

*In future, unless they contain matter of exceptional interest, papers on the treatment of amoebiasis with emetine will be cited in the Lists of References only, and will not receive notice in the text.—ED.

The second part deals with the morphological changes observed in amoebae obtained from the stools of patients undergoing treatment with these drugs. The author points out that in untreated cases the amoebae, when wet fixed and stained with haemotoxylin, show a cytoplasm which stains faintly and contains many delicate granules arranged in a network. The nucleus, if of the "tetragena" type, is oval or circular, and contains a round or irregularly shaped body staining darkly, the karyosome, which surrounds a smaller, densely staining body, the centriole; if of the "histolytica" type the karyosome is relatively small and stains less densely. If the amoebae are kept for one to two hours in a moist chamber before being fixed and stained, certain degeneration forms appear characterised by disappearance of the nuclear network, and collection of the chromatin into large blocks against the nuclear membrane with loss of staining of the karyosome. Later, such phenomena as extrusion of the nucleus, and the appearance of the so-called chromidia in the cytoplasm, are sometimes seen.

In patients treated with bismuth subnitrate such changes as those described above are observed in amoebae fixed and stained immediately after their passage from the body.

In patients treated with emetine a different series of changes is observed. The nucleus at first is swollen. The chromatin is broken up into fine granules. The karyosome is increased in size and more distinct. Later the chromatin, karyosome and lining all appear as granules, the cytoplasm stains feebly and fibrils are observed in it.

The plate gives drawings of the amoebae, bringing out the various points mentioned.

S. R. D.

BROOKE (Roger). **The General Action of Quinine in the Treatment of Amebic Dysentery.**—*Jl. Amer. Med. Assoc.* 1914. Mar. 28. Vol. 62. No. 13. pp. 1009–1010.

The author, after discussing the various treatments for dysentery commonly used, including treatment both with ipecacuanha and emetine, states that he treated 10 chronic cases of amoebic dysentery with quinine with seemingly good results. The doses of quinine given were 1·5 to 2 grams daily by the mouth for about six days.

S. R. D.

WINN (Claud M.). **The Therapeutic Effect of Salvarsan in the Treatment of Amoebic Dysentery and Amoebiasis. Report of Twelve Cases: A Preliminary Note.**—*Proc. Canal Zone Med. Assoc. for the Half-Year April to Sept. 1912.* Vol. 5. Pt. 1. pp. 7–10.

The author reports 12 cases of dysentery treated with salvarsan with good result. That the improvement was due to the salvarsan, he deduces from the following observations:—

1. The number and character of the stools changed within 24 hours.
2. Arsenic was demonstrated in the stools within five hours.
3. The amoebae disappeared from the stools within 24 to 72 hours of the administration of the drug.

S. R. D.

WHEELER (George W.). **Amebic Dysentery. Report of a Case apparently cured with Neosalvarsan.**—*U.S. Public Health Rep.* 1914. Mar. 13. Vol. 29. No. 11. pp. 627-629.

The author reports a case of amoebic dysentery of seven months' duration, who when first seen was passing 14 stools per diem, consisting largely of blood and mucus and containing large numbers of amoebae.

Neosalvarsan, 0·9 gram, was given intravenously, followed by a similar dose in 48 hours; no untoward symptoms followed the treatment; there was instead a rapid improvement, the stools becoming normal and the amoebae disappearing.

Some weeks afterwards the man was in perfect health.

S. R. D.

DARLING (S. T.). **Notes on the Life History and Viability of** *E. tetragena.*—*Proc. Canal Zone Med. Assoc. for Half-year April to Sept. 1912.* Vol. 5. Pt. 1. pp. 67–71.

The present paper covers much the same ground as the author's previous publications on the pathogenic Entamoebae of dysentery, which he reviews. In addition, he gives his experiences of a case of naturally acquired dysentery in a dog, which is of interest from its connection with preventive measures. The author states:—

"From a study of a case of dysentery naturally acquired in a dog, I was able to note some very early lesions. And in these the trophozoites were dotted along the surface of the mucosa, and had there produced the very early lesion of superficial erosion of the epithelial cells. In this infection, at any rate, they were not admitted to the submucosa at once, but were found at the very surface. In many places they had eroded the mucosa as far as the muscularis mucosae. . . ."

"I wish to call your attention to the case of naturally acquired dysentery of a dog mentioned above. The dog was sent to the Laboratory for observation and I found, in addition to coccidiosis and hookworm disease, that he had extensive entamoebic colitis. It is impossible to say whether he died as a result of the hookworm infection or the *entamoebae*, and although *entamoeba* cysts could never be detected, the trophozoites were closely similar to those seen in man. I feel that we should bear in mind the possibility of dogs and cats acting as carriers of entamoebic dysentery, and be on our guard against them."

[It would be interesting to determine the effect of coccidiosis in dogs.]

H. B. F.

KUMAGAWA (M.). **An Investigation of Pathogenic Amoebae.** [In Japanese.]—[*Tokyo Medical Journal.* [Tokyo iji-shinshu.] 1913. Sept. No. 1835-1836-1837].

The author has made detailed investigations of the entamoebae which he got from the faeces of cases of amoebic dysentery in Japan and some parts of China. He examined more than five thousand fresh and stained specimens, and tried several methods of cultivation, and also animal experiments. He concludes:—

1. *Entamoeba tetragena* is found in the faeces of dysentery patients in Japan and China.
2. *Entamoeba tetragena* reproduces not only by simple division, but by schizogony and conjugation (the author showed microphotographic illustrations).

3. The differentiation between *Entamoeba histolytica* and *Entamoeba tetragena* is still doubtful.

4. *Entamoeba tetragena* and *Entamoeba coli* cannot be cultivated in artificial media as has been reported by several investigators.

5. It is appropriate to apply the name of "*Entamoeba dysenteriae*" to the Entamoeba which causes dysentery, as COUNCILMAN and LAFLEUR have proposed.

6 *Entamoeba coli* is found in 32·7 per cent. of 110 healthy persons in Tokyo.

M. Kumagawa.

FISCHER (Walther). **Ueber Amöbenzystitis.** [On Amoebic Cystitis.]—*München. Med. Wochenschr.* 1914. Mar. 3. Vol. 61. No. 9. pp. 473–474.

The report of a case of amoebic infection of the bladder. The patient, a thirty year old Chinaman, presented himself at the out-patient department of the hospital at Shanghai complaining of painful micturition. There was no history of dysentery. The urine was turbid, yellow and very acid and gave a thick white sediment, which under the microscope showed numerous amoebae not distinguishable from *E. tetragena*. Unfortunately the patient would not become an in-patient and did not return to the out-patient department. The amoebae were from 15 to 25μ in diameter; no cysts were seen.

S. R. D.

BEHREND (Kurt). **Kurze Angaben über eine nichtpathogene Amöbe aus dem Darm von** *Macacus rhesus*. [On a Non-pathogenic Amoeba from the Intestine of *Macacus rhesus*.]—*Arch. f. Protistenkunde*. 1914. Mar. 28. Vol. 34. No. 1. pp. 35-38. With 8 text figs.

The author gives a preliminary account of an amoeba found by him in a *Macacus rhesus* at the Institut fur Schiffs- und Tropenkrankheiten at Hamburg. The cysts of the amoeba only could be determined with certainty, while in a few forms it was doubtful if they were free or encysted. The cysts varied from 8 μ to 25 μ, they were circular or oval, with a cyst wall of variable thickness. The cytoplasm was alveolar or uniformly granular. Most cysts contained vacuoles. When the vacuoles were obvious, the nucleus was indistinct and *vice versa*. A karyosome was often present in the nucleus. Usually one nucleus occurred, two were fairly common, four were less frequent, while eight nuclei were seen twice. Chromidia or "chromatin" masses occurred at almost all nuclear stages, numbering from 2 to 20, and of variable sizes. In binucleate cysts these masses were often somewhat concentrated. In tetranucleate cysts the chromatin rods lay between the two pairs of nuclei. The eight-nucleate cysts showed no chromatin rods. Glycogen occurred in the cysts, sometimes concentrated, sometimes diffuse.

The action of acid pepsin solution for 24 hours at 37° C. only produced slight digestion of the nucleus and chromatin masses.

The author remarks justly that until the complete life-cycle of the amoeba is known, it cannot be identified with certainty, though the presence of an eight-nucleate cyst suggests affinity with *E. coli*.

H. B. F.

Bacillary Dysentery.

Bofinger. **Ueber eine durch den sog. Y-Bazillus hervorgerufene Ruhrepidemie.** [An Epidemic of Dysentery due to the So-called Y-Bacillus.]—*Deut. Militärärztl. Zeitschr.* 1914. Feb. 20. Vol. 43. No. 4. pp. 141-147.

An account of an epidemic of dysentery due to the Y-bacillus which broke out in a cavalry regiment in Württemberg in the summer of 1913. As dysentery has been practically unknown in the Württemberg army-corps for several years, the circumstances of its introduction in the present case appear to the author to be interesting. The infection seems to have been imported from outside by sundry visitors to a riding competition who came from Alsace, where dysentery is endemic. The meeting having been held on the 24th and 25th of May, the first case of diarrhoea showed itself on the 30th of the same month, *i.e.* after a four and a half day's interval, which is the incubation period of the Y-bacillus. The number of men affected gradually increased to 52 in all. There were no deaths, and the clinical symptoms mainly consisted in the passing of bloody motions, with a certain amount of fever. The same bacillus was isolated in every case, and it answered generally in its characters to the so-called Y-bacillus. Amongst the men of the regiment who presented no symptoms of dysentery, no less than 13 were found to be carriers of the bacillus by bacteriological examination of their stools. The usual precautions were taken against the further spread of the disease, and by the end of six weeks the epidemic had been stamped out, without any further extension amongst the regiments of the garrison.

S. R. D.

Keuper (E.). **Ueber eine Ruhrendemie bei kleinen Kindern.** [An Epidemic of Dysentery in Young Children.]—*München. Med. Wochenschr.* 1914. Mar. 3. Vol. 61. No. 9. pp. 474-476.

An account of an outbreak of bacillary dysentery occurring in a children's ward in a hospital at Frankfort. Out of 23 children 20 developed dysentery and there were six deaths. The disease was introduced by a child suffering from whooping cough. The mode of infection from child to child was not traced. The bacillus causing the epidemic was of the pseudo-dysentery type of Kruse.

S. R. D.

Desderi (Paolo). **Una Nuova Epidemia di Dissenteria bacillare in Piemonte.** [A Further Epidemic of Bacillary Dysentery in Piedmont.]—*Pathologica.* 1914. Feb. 15. Vol. 6. No. 127. pp. 99-101.

An account of an epidemic of bacillary dysentery occurring in the months of August, September and October, 1913 in the district of S. Damiano d'Asti, Piedmont.

Three hundred people were attacked, 12 fatally. There was a slight amount of fever, 38°-39° C. An organism resembling the dysentery bacillus was isolated but this could not be exactly placed in any of the known types. Mannite was fermented but there was no fermentation in glucose, saccharose or maltose broths. The organism was

non-toxic to rabbits. No agglutination with any of the stock dysentery sera which were available was obtained. The introduction of the disease was traced to soldiers who had returned from Tripoli and the spread to the water supply becoming polluted.

S. R. D.

GETTINGS (H. S.). **Dysentery Past and Present.** [Adjourned Discussion.]—*Jl. of Mental Science.* 1914. Jan. Vol. 60. No. 248. pp. 39-56. With 1 chart.

*This discussion was opened by Sydney COUPLAND, who showed very complete charts indicating the incidence of dysentery and also of dysentery and diarrhoea in the various asylums of England. With regard to Gettings's proposition that the disease was propagated by "carriers" he was seemingly very unconvinced but his knowledge of the bacteriology of dysentery may be gauged by the following quotation:—"It is gratifying that bacteriologists are working in this field although so far, I believe, they have not succeeded in isolating the specific dysentery organism, or, at any rate, unanimously agreeing as to its identity."

As an alternative to the spread of the disease in asylums by "carriers" he brought such propositions as the influence of cold and wet and certain sanitary defects.

After several other speakers had made remarks, Gettings replied and showed that wet and cold could not be important factors as some of the epidemics had occurred in very hot dry summers. With regard to the isolation of the bacilli causing the outbreak he stated that this was not a very difficult feat, "in fact his laboratory boy did it regularly," but the real difficulty was that the "carrier" gave no signs of the disease.

S. R. D.

DRESEL (E. G.) & MARCHAND (Fritz). **Bakteriologische und klinische Beobachtungen bei Ruhrinfektionen.** [Bacteriological and Clinical Observations on Dysentery.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1913. Dec. 12. Vol. 76. No. 2. pp. 321-349.

An account of an outbreak of dysentery observed in the Heidelberg clinique in the summer of 1911. The most notable point raised by the authors is that many contacts with the infected cases, although showing no symptoms of the disease, gave a positive agglutination. The dilution of serum which the authors considered significant both for the Flexner and Shiga organism was 1 in 100.

S. R. D.

BATES (L. B.). **Ants as Possible Transmitting Agents in Typhoid Fever and Bacillary Dysentery.**—*Proc. Canal Zone Med. Assoc. for the Half-Year April to Sept. 1912.* Vol. 5. Pt. 1. pp. 33-36.

The author records some experiments in which he fed ants on bread soaked in culture of *B. typhosus*. After intervals of from two to six days cultures were made from the intestinal contents. These cultures never revealed the presence of *B. typhosus*. Further experiments

*For the summary of GETTINGS's paper see this *Bulletin*, Vol. 3, p. 84.

were then carried out in which the ants immersed in broth cultures of *B. typhosus* were roughly dried with filter paper and allowed to crawl over plates of nutrient media 10 minutes, 30 minutes, 1 hour, 18 hours and 24 hours after the contact with the broth culture; in no case did any colonies of typhoid bacilli grow.

Seeking for an explanation of these results the author analysed the ants and found that one species contained as much as 1·43 per cent. of the body weight of formic acid, another species 2·1 per cent.

Formic acid was found to be a very strong antiseptic and the presence of this substance most probably accounts for the negative results obtained in the experiments. S. R. D.

Morison (J.) & Chitre (G. D.). **Interim Report on the Causes of Diarrhoea in Poona.**—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3. pp. 278–283. 1913. Simla: Govt. Central Branch Press.

The most important part of this paper is concerned with the results obtained by the bacteriological examination of the faeces.

This investigation was carried out in 95 cases of diarrhoea and dysentery. Some 1500 organisms were isolated and their sugar reactions ascertained. The authors were unable to identify any single organism as the cause of the diarrhoea and dysentery but Morgan No. 1; the bacilli of Flexner and Shiga, or two organisms of somewhat similar powers of fermenting sugars, were found in 47 cases.

Morgan's No. 1 bacillus was isolated from the stools of 16 cases, 10 of which were clinically suffering from acute diarrhoea, 6 from dysenteric symptoms.

Shiga's bacillus was also found in 16 cases, 8 of whom were cases of dysentery, 7 acute diarrhoea, and 1 suspected of having cholera.

Flexner's bacillus occurred in 10 cases, 6 being acute diarrhoea and 4 being dysentery.

Ten cases showed organisms having fermentation reactions approaching those of the recognised dysentery bacilli. S. R. D.

Dumas (R.). **Action de l'Emétine sur la Dysenterie Bacillaire Pure.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 140–141.

A short note in which the author states that emetine is without any curative effect in pure bacillary dysentery. As bacillary dysentery seen in Saigon is generally of a very mild type, frequently subsiding with practically no treatment, cases of mixed amoebic and bacillary dysentery rapidly improve under emetine treatment; and this has in some cases given observers the impression that emetine had a curative action in the bacillary type of the disease.

S. R. D.

Lunn (W. E. C.). **Toxaemic Arthritis as a Complication of Acute Dysentery.**—*Jl. R. Army Med. Corps.* 1914. March. Vol. 22. No. 3. pp. 310–312.

The account of a case of dysentery at first believed to be amoebic, but emetine treatment was without effect and the administration of magnesium sulphate quickly brought about the disappearance of the

intestinal symptoms. During the patient's convalescence, however, symptoms of acute arthritis appeared, the right ankle, left knee and left elbow being the joints affected. The arthritis was intensely painful and was accompanied by a purpuric rash. The symptoms gradually subsided, the left knee joint requiring aspiration, and by this operation a clear sterile fluid was obtained. No investigations to isolate the dysentery bacilli from the stools appear to have been undertaken. S. R. D.

Mixed and Unclassed Dysentery.

Bahr (P. H.). **A Study of Epidemic Dysentery in the Fiji Islands with Special Reference to its Epidemiology and Treatment.**—*Brit. Med. Jl.* 1914. Feb. 7. pp. 294-296.

The author records his observations of the dysentery occurring in the Fiji Islands in the year 1910, when he had the opportunity of following some 170 cases. The usual type was bacillary, amoebae being demonstrated in the stools of only 11 cases. All nationalities—Indians, Fijians, Solomon Islanders, Europeans and half castes—were seemingly equally affected. Fifty-three per cent. of the cases occurred among prisoners undergoing sentence. Dysentery bacilli were isolated from the stools of 35 cases and from the intestinal mucosa of two cases post-mortem. The usual type was Shiga bacillus but the Y bacillus was nearly as common. Strong's bacillus was also observed and on three occasions an organism which has been described by Ohno, and has a feeble power of fermenting lactose, was isolated. The clinical manifestations of the disease varied greatly, there being considerable elevation of the temperature in some cases, others having a subnormal temperature throughout. No hepatic symptoms were observed in any of the bacillary cases. Only one case had a tendency to relapse. The serum obtained from 74 per cent. of the cases agglutinated one or other of the dysentery bacilli, but never before the sixth day of the disease.

Passing on to the epidemiology, the author noted that the maximum incidence of the disease occurs during the months of December, January, February, March, and April, that is, the period of highest mean temperature and the largest rainfall.

In searching for an explanation of this seasonal prevalence, the author, having excluded the possibility of the water supply being at fault, and direct contamination of food stuffs being unlikely as all races are equally affected although their dietaries vary markedly, sought for some indirect contamination of food and at once his suspicion fell upon the house fly, which is a veritable pest and is most numerous during those months when the dysentery is most rife. Investigating the bacterial flora of flies caught in the dysentery wards of the hospital, he isolated the Shiga bacillus on two occasions from their intestines; and he believes these observations have some value, taken in consideration with the seasonal incidence of the disease and concomitant prevalence of flies.

Continuing this experimental work on flies in this country, the author found that by raising flies from their pupae under as sterile conditions as possible and then feeding them on food contaminated with cultures of dysentery he was generally able at varying intervals to

isolate the dysentery bacilli from their intestinal tract. No evidence however could be obtained that multiplication of these organisms took place in the fly. Another interesting fact elucidated was that occasionally the fermenting properties of the dysentery bacilli were temporarily altered by passage through the intestine of the fly.

With regard to the treatment the first 53 cases were treated with salines only and the mortality was 13·2 per cent. Of the remaining 106 cases 34 were treated with salines and cyllin and the remaining 72 cases received in addition a dose of the Lister Institute polyvalent serum intravenously, the dose varying from 20 to 70 cc. Although the disease was apparently as severe as in the series of cases treated with salines only, the mortality was only 1·8 per cent. and these two deaths were not directly due to the dysentery.

This paper contains so many observations, so much experimental work and covers so much ground that it is very difficult to give a good idea of it in an abstract, and anyone interested in the subject of dysentery should consult the original communication. S. R. D.

DENIER. **Examen des Selles des Malades atteints d'une Affection Intestinale, pendant les Mois de Juin et de Juillet 1913.**—*Ann. d'Hyg. et de Méd. Colon.* 1913. Oct.–Nov.–Dec. Vol. 16. No. 4. pp. 1167–1174.

The author at the Saigon laboratory examined a large number of stools of patients suffering from intestinal infections to determine whether the organisms of amoebic or bacillary dysentery were present. In mucous or serous stools he obtained the following results (July) :—

TABLE I.

Entamoebae of Dysentery	26
Bacilli „ „	7
Mixed cases	8
Negative examinations	17
Total	58

Or, represented in percentages :

Cases where entamoebae were found	58·62 per cent.
Cases where bacilli were found ..	25·86 „
Negative cases	29·31 „

In faecal stools the figures were somewhat different as the subjoined table shows :—

TABLE II.

Entamoebae of dysentery	8
Bacilli	7
Mixed cases	2
Negative examinations	21
Total	38

Or, represented in percentages :

Cases where entamoebae were found	26·31 per cent.
Cases where bacilli were found ..	23·68 „
Negative cases	65·51 „

G. C. Low.

CUNNINGHAM (J.) & HARVEY (W. F.). **Dysentery, Problems and Proposals.**—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3. pp. 268–276. 1913. Simla: Govt. Central Branch Press.

This paper consists of a dissertation on the various disputed points in the etiology etc. of dysentery, the term dysentery being used in its widest sense. So many of these problems have since been elucidated by careful experimental work carried out in various parts of the world by competent investigators that it seems unnecessary to follow the authors through the maze of their reasonings.

One piece of experimental work is given in which the authors investigated the agglutinating power of the serum towards various types of dysentery bacilli found in a series of individuals taken at random. At the same time they enquired as to the clinical history of dysentery. The conclusion come to by this method was that there was but very slight correlation between a history of dysentery and a corresponding serum agglutination. S. R. D.

BOURRET (G.). **La Dysenterie à Hué.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 678–681.

The author examined the stools in 18 cases of dysentery (15 Europeans and three Annamites) and found amoebae in all. In six the amobae seen were certainly *E. tetragena*. Experiments on cats, faeces being inoculated intrarectally, were carried out in seven cases, but there was only one positive result and the animal recovered. Dysentery bacilli were sought for in six cases with one positive result, an organism of the Shiga type being isolated from the stools of a child aged five.

Dysentery bacilli and entamoebae were sought in the water supply with a negative result. S. R. D.

LUTSCH (Walter). **Ueber Ruhrbehandlung.** [The Treatment of Dysentery.]—*München. Med. Wochenschr.* 1914. Mar. 3. Vol. 61. No. 9. pp. 476–477.

The author recommends the injection of a 2 per cent. solution of sodium salicylate into the large intestine in cases of dysentery. The quantity should be about 650 cc. for an adult and 90 cc. for a child one year old. These injections should be repeated every other day; they cause a good deal of pain. In addition 3 decigrams of calomel are given when the case is first seen and 3 decigrams of pulv. ipecac. cum opio every 4 hours. The type of dysentery (whether amoebic or bacillary) to be treated in this way is not mentioned. S. R. D.

EVERS-ANGAUR. **Ueber die Behandlung von Dysenterie mit Chinosol.** [On the Treatment of Dysentery with Chinosol.]—*Trans. xvii Intern. Congress of Med., London.* 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2. pp. 75-76.

The author recommends chinosol for all forms of dysentery and bases his experience on 32 cases, of which 13 cases were amoebic. He states that since using chinosol he has had no deaths or relapses. The doses administered by the mouth were 4 grams daily given in watery

solution, 1 in 250, which was also used as enemata. Intravenous injections of 0·2 grams in 50 cc. of water were also found effective. In cases of amoebic dysentery the entamoebae rapidly disappeared from the stools. S. R. D.

MÜHLMANN (M.). **Zur Aetiologie und Pathogenese der dysenterischen Leberabszesse.** [On the Cause and Origin of Liver-Abscesses.]—*Beiträge z. pathol. Anat. u. allg. Pathol.* 1914. Jan. 20. Vol. 57. No. 3. pp. 551-572.

The author, as prosector to a Russian hospital in the Baku oil-region, had occasion to notice the predominance of liver-abscess arising from dysentery amongst workmen of Russian nationality, which he attributes to intemperance. Out of 88 such cases coming to an autopsy, 77 were of Russian nationality, as against seven Armenians, two Persians, one Swede and one Lesgian (eastern Caucasian).

In order to test the hypothesis that alcoholism predisposes to dysenteric liver-abscess, the author fed 11 rabbits on food soaked in alcohol for periods ranging from two to four months. They were then injected with doses of dysentery-toxin obtained from a 14-day old broth-cultures of B. Shiga-Kruse. All developed without exception abscesses in the liver, besides the usual haemorrhagic inflammation of the caecum. Half the number received injections in the vein of the ear, and in the other half the abdomen was opened and injection made into the portal vein. Of eight control rabbits similarly injected, seven died within four days, but abscesses of the liver were only found in those which were suffering from coccidiosis. The author concludes from these experiments that liver-abscess is never more than a complication of bacillary dysentery in unhealthy subjects. Of the amoebae present he expresses the venturesome opinion that they only play the part of a complication (*nur die Rolle einer Komplication*) which makes the disease more serious. The news of ROGERS's treatment would appear not to have reached the author at the time when he was writing his paper.

S. R. D.

TEISSER (Pierre). **Presence de Spirilles dans l'Intestin, leur Importance; à propos de Deux Cas de Dysenterie Amoebo-Spirillaire.**—*Bull. Acad. Méd., Paris.* 1914. Jan. 13. 3ᵉsér. Vol. 71. (78ᵉAnnée.) pp. 51-52.

The record of two cases of dysentery in which in addition to amoebae large numbers of spirilla were found in the stools. These spirilla resembled those described by MUEHLENS. The author believes these organisms to have a pathological significance.

S. R. D.

CASTELLANI (Aldo). i. **Note on an Intestinal Protozoal Parasite producing Dysenteric Symptoms in Man.**—*Jl. Trop. Med. & Hyg.* 1914. Mar. 2. Vol. 17. No. 5. pp. 65-66. With 2 plates.

ii. **A Further Case of Entoplasmosis.**—*Ibid.* Mar. 16. No. 6. pp. 83-84.

i. In the first of these papers the author states that, in three patients suffering from mild dysenteric symptoms, he has observed in the

stools what he believes to be a protozoal parasite, hitherto undescribed. These so-called parasites were bodies 45 to 55μ in diameter, oval in shape and in fresh specimens actively motile. Although he lays stress on this motility, no flagella could be made out. The protoplasm was vacuolated and no definite nucleus was seen. Preparations stained with Giemsa or Leishman showed the protoplasm blue and the vacuoles evenly distributed. In some of these bodies a mass of chromatin-like granules was to be seen; these the author believes to be a nucleus. All attempts at cultivation failed. He discusses at length the zoological position of this body and proposes the name of Entoplasma.

Two plates are given figuring these bodies, one being from a drawing, the other from microphotographs.

ii. The second paper adds but little information, being merely the report of a further case with the same symptoms, in which on examination of the stools the same bodies were seen. Preparations stained with iron-haematoxylin, in the author's opinion, confirmed his suspicion that the granules noted in his former paper were a nucleus.

[The author brings forward no further evidence that these bodies are protozoa or have anything to do with the causation of the dysenteric symptoms.] S. R. D.

ROGERS (Leonard). **Dysenteries. Their Differentiation and Treatment.**—xi + 336 pp. With 10 plates, 2 charts and 3 diagrams. 1913. London: Henry Frowde & Hodder & Stoughton. [Price 10/6 net].

This book is reviewed on page 507.

FLAGELLATE DYSENTERY.

GÄBEL (Max). **Zur Pathogenität der Flagellaten. Ein Fall von Tetramitidendiarrhoe.** [A Case of Diarrhoea due to Flagellates belonging to the Tetramitidae.]—*Arch. f. Protistenkunde.* 1914. Mar. 28. Vol. 34. No. 1. pp. 1-34. With 2 plates.

The author gives an account of a case of flagellate diarrhoea together with a description of the causal parasite. The patient was a lady who went to Tunis in 1890, when 25 years of age. After four years, she returned home and then suffered from diarrhoea accompanied by liver swelling. This was perhaps due to the drinking of brackish, but boiled, water in Tunis. From 1897 onwards, each year the patient suffered from diarrhoea, as many as 20 motions being passed daily. The dejecta were not blood-stained, but frothy and in part whitish. The diarrhoea set in regularly in May and ended in October. The attack commenced with lassitude and some feverishness. Great pain occurred in the back. Improvement set in when the weather became cooler. The case was complicated by two heart attacks. In 1906 the violence of the diarrhoeic attacks gave rise to suspicion of cholera or typhoid, and the patient returned to Europe, improvement occurring as soon as she left Tunis. In 1909 she was in a German hospital for two and a half months, and was treated for a tumour in the umbilical region. In 1910 the diarrhoea ceased, and the patient went to Switzerland. While there she drank glacier water and the diarrhoea returned. She had attacks also in Tunis in the summers of

1911 and 1912, and at the end of 1912 came to Germany, and for a year was under the care of the author.

On examination the faeces of the patient were found to contain *Entamoeba coli* and numerous flagellates belonging to the Trichomonads. The examinations and treatment of the case are given at length. The morphology of the flagellates is described. They were small pear-shaped bodies 6·5μ to 8μ long by 5μ to 6μ broad, possessing three or four flagella and no undulating membrane. No supporting skeletal structure was present. A large cytostome, situated anteriorly near the nucleus, admitted food. Reproduction occurred by simple division, isogamous copulation and autogamy, the latter process leading to cyst formation.

The classification of the Tetramitidae is discussed at length and the author finally forms a new genus, *Difämus*, for the flagellates he describes, the new species being *tunensis*. He differentiates the new genus from *Tetramitus*, as it lacks an undulating membrane in its cytostome.

A summary of the opinions of previous workers on the pathogenicity of flagellates found in diarrhoeic cases is given, and the author believes that Difämus has often been confused with Trichomonas. He considers that its pathogenicity is established with certainty.

H. B. F.

Mayer (Martin). **Beitrag zur Emetinbehandlung der Ruhr. Die Wirkung des Emetins bei der Lamblienruhr.** [Contribution to the Emetine Treatment of Dysentery. Action of Emetine in Lamblia-Dysentery.]—*München. Med. Wochenschr.* 1914. Feb. 3. Vol. 61. No. 5. pp. 241–242.

The record of a case of dysentery admitted into the Hamburg hospital for seamen. The patient was a ship's officer returned from Bombay, who was attacked with dysentery two days after leaving that port. On examination the stools were found to contain cysts and vegetative forms of *Lamblia intestinalis*, with which were associated many spirochaetes. No amoebae were detected.

Emetine hydrochloride was given subcutaneously in ·05 gm. doses, five injections in all in seven days. Improvement was immediate; after the first dose only dead Lamblia cysts were to be discovered, and by the end of the seventh day no Lamblia could be demonstrated. The patient was discharged cured in fourteen days.

S. R. D.

Balantidial Dysentery.

Walker (Ernest Linwood). **Experimental Balantidiasis.**—*Philippine Jl. of Science.* Sect. B. Trop. Med. 1913. Oct. Vol. 8. No. 5. pp. 333–349. With 7 plates.

This interesting paper begins with a short historical account of balantidiasis since Malmsten reported the first case at Stockholm in 1857. The geographical distribution, mortality (up to 29 per cent.), pathology and histology of the lesions are then briefly reviewed. The main object of the memoir, to set forth the results of experimental work, is then reached. Monkeys were used. It is noted that "the

balantidium found in the intestine of the pig is generally considered not to produce any symptoms or lesions in its host." In faeces of the pig the balantidia are usually found encysted, but in human faeces they are generally motile. Dysenteric symptoms are extremely inconstant. *Balantidium coli suis* was used more frequently than *Balantidium coli hominis* because "human cases that showed a sufficient number of the parasites in their stools were not frequently obtainable and, moreover, it was especially desired to determine the parasitism and pathogenesis of the balantidium of the pig for the monkey." The experimental monkeys were either fed or injected rectally with faeces containing balantidia. Concerning the terms "parasitize" and "infect," the author uses the latter term only when the balantidia are found to have penetrated into the intestinal walls, the former term is used to denote those cases in which the organisms are found in the intestinal contents, but the intestines show no lesions.

The author's summary and conclusions are given at length :—

"1. Parasitization of man with *Balantidium coli* is relatively common in the Philippine Islands.

"2. The balantidia appear in the stools of parasitized individuals only at irregular intervals, and consequently infections, unless accompanied by clinical symptoms, may frequently be overlooked.

"3. A large proportion of the pigs in and about Manila are parasitized with balantidia.

"4. Balantidia are passed in the resistant encysted stage more or less constantly in the stools of parasitized pigs.

"5. Morphologically *Balantidium coli suis* is identical with *Balantidium coli hominis*.

"6. Forty per cent. of five monkeys fed or injected rectally with *Balantidium coli hominis* became parasitized.

"7. Seventy and five-tenths per cent. of 17 monkeys fed or injected rectally with *Balantidium coli suis* became parasitized.

"8. Monkeys parasitized with either *Balantidium coli hominis* or *Balantidium coli suis* show the parasites in the stools only at infrequent intervals.

"9. Only a small proportion of the parasitized monkeys became infected. Of two monkeys parasitized with *Balantidium coli hominis*, one, and of 12 monkeys parasitized with *Balantidium colis suis*, one, showed the parasites in the tissues post mortem.

"10. The early lesions of the intestine of monkeys infected with *Balantidium coli* consist only of a slight hyperaemia with or without punctiform haemorrhages.

"11. Histological examination of the tissues of monkeys recently infected with *Balantidium coli* show changes, notably vascular dilation, minute haemorrhages, round-cell infiltration and eosinophilia, which distinguish them from lesions of bacterial origin.

"12. *Balantidium coli* was never found entering the tissues through the lesions in ten parasitized monkeys having a colitis or ulcerations due to bacteria or other causes.

"13. In those monkeys in which infection took place, the balantidia entered the tissues through the sound intestinal epithelium.

"14. *Balantidium coli* can produce bacteriologically sterile abscesses in the submucosa of an infected intestine.

"15. *Balantidium coli* is the primary etiologic factor in the symptoms and lesions of balantidial dysentery.

"16. The latency prevalent in balantidiasis of man is due chiefly to the fact that the patient, although parasitized, is not infected with *Balantidium coli*, but in part to the chronicity of the ulcerative process in infected cases.

"17. Every person parasitized with *Balantidium coli* is liable sooner or later to develop balantidial dysentery.

"18. *Balantidium coli suis* is identical with *Balantidium coli hominis.*

"19. The domesticated pig is the chief source of infection in the balantidiasis prevalent in the Philippine Islands.

"20. Therefore, efficient prophylactic measures against balantidiasis in the Philippine Islands should be directed against these animals, which should be confined and not allowed to run in yards and dwellings."

The plates show photomicrographs of sections of large intestine of experimentally infected monkeys, sections of mesenteric glands of monkeys, and sections of large intestine of man dead from balantidial dysentery.

H. B. F.

CHOLERA.

Ross (W. C.). **The Epidemiology of Cholera.**—*Proc. Second All-India Sanitary Conference.* 1912. Vol. 3. pp. 152-158. 1913. Simla: Govt. Central Branch Press.

The author advances the proposition that the amount of effort on the part of the Sanitary Authority to prevent different diseases should vary as the virulence of the disease and the efficiency of the means of prevention at our disposal. Judged from this point of view cholera prevention is relatively neglected. The chief factors in the spread of cholera are carriers, climate, crowds, contamination of food and drink and bad conservancy. All the factors are considered individually, but conservancy receives the largest amount of attention. The life history of the fly, its rate of reproduction under different conditions of moisture and warmth, and its bacteriology are briefly discussed. Conservancy is notoriously bad in India, and its improvement would be the most successful method of effectively breaking one of the links in the chain of factors necessary to the production of an epidemic. There is nothing very new in the paper.

W. J. Penfold.

Low (R. Bruce). **The Manifestations of Cholera throughout the World during the Years 1911 and 1912.**—*Forty-Second Ann. Report of the Local Govt. Board.* 1912-13. Supplement containing Report of Medical Officer for 1912-13. Appendix A. No. 2. pp. 88-147. 1914. London: Printed under the Authority of H.M. Stationery Office. [Cd. 7181.]

The paper is of the nature of a summary itself and it is difficult to give any just idea of it.

In India in 1910 and 1911 the mortality rate was 1·9 and 1·48 per 1,000 respectively. The reports for 1912 are not yet complete. In the Bengal presidency the mortality rates from cholera for 1911–12 were 1·49 and 2·1 per 1,000 respectively, the average for the last five years having been 2·45. In Calcutta the cholera deaths in 1911 were fewer than in any year for the last ten years. The mortality rates of all the other Indian provinces are passed in review, recent cholera rates being sometimes smaller and sometimes larger than average rates over long periods. The causes of the continued large incidence of the disease in India are considered in some detail, no new points, however, emerging. The seasonal distribution of cholera in the different provinces is largely dealt with in different tables.

In a similar way French India, Malay States, Dutch East Indies, Siam, Indo-China, China, Japan, the Philippines, Egypt, Arabia, Turkey and many other countries are dealt with—frequently, however, on but a very unreliable and incomplete statistical basis. The cases of the European and American countries, which received during these years so many persons carrying cholera germs and still had no local epidemics, is gone into in much interesting detail. The paper is extensive and would well repay perusal by any interested in the wider aspects of cholera epidemiology.

W. J. P.

GASIOROWSKI (Napoleon). **Die Cholera in Galizien im Jahre 1913.** —*Das Oesterreich. Sanitätswesen.* 1914. Mar. 26. Vol. 26. No. 13. pp. 161-180. With 4 text figs.

In 1913 an epidemic of cholera occurred in the Skole district and the author carried out the necessary bacteriological work required in the epidemic. He established in a local station the movable cholera laboratory provided by LAÜTENSCHLÄGER and examined all material there. In respect of technique it is interesting to note that peptone water enrichment followed by ordinary agar plating was even more efficacious than the use of PILON'S special medium when dealing with faeces containing only few vibrios. 574 samples of faeces and 85 of water were examined. Amongst 44 suspected cases of cholera only 20 were found positive on bacteriological investigation; the remaining 24 were shown to be definitely free from cholera by post mortem or other methods of examination; so that the author concludes that no genuine cases were missed by the bacteriologist. Brief clinical histories of each of the 20 positive cases are given. 55 per cent. were fatal. About half of the cases were extremely acute—the algid stage supervening in half to one hour from the onset of the disease. The naturally debilitated persons attacked had a smaller case mortality than the apparently strong and healthy. The sera of six patients were examined for agglutinins from 12 to 17 days after convalescence had been established, when it was found that two reacted definitely in dilutions above 1/20. 297 contacts were examined as suspected carriers and only five found positive—25 per cent. of the number of actual cases of the disease.

From the 85 samples of water examined from the River Opor by the peptone water enrichment method the specific vibrio was isolated four times. The epidemic appears to have been introduced into Galicia from neighbouring infected Hungarian villages through direct or indirect contact and to have spread locally by contact. No evidence was found suggesting that the river materially contributed to the spread of the disease.

As preventive measures used may be mentioned:—Control over traffic from Hungary with the exclusion of importation of fruit. Instruction to the people how to avoid cholera. Disinfection of the River Opor with lime, which was, however, not very effective. Isolation of the patients and contacts.

W. J. P.

CRASTER (Charles V.). **Ship-Borne Cholera. The Sea as a Factor in the Transmission of Asiatic Cholera.**—*Jl. Amer. Med. Assoc.* 1913. Dec. 20. Vol. 61. No. 25. pp. 2210-2214.

The paper deals with the work of the quarantine station of New York. From June 14th to August 18th, 1911, the ships entering the port reported six cases of cholera fatal at sea, four cases occurring at sea and well on arrival, and six cases occurring at sea and still ill on arrival. In addition fifteen cases developed at quarantine, three amongst persons released from quarantine and one amongst the quarantine attendants. 31 carriers were detected. On July 16th a Treasury order made it necessary to take rectal swabs from all steerage passengers. The cotton swab was moistened with peptone water and

inserted above the sphincter, making sure that a fair sample of faeces was removed. The swab was dropped into peptone water and the tube numbered. After six hours this was subcultured into another peptone water tube and after nine or ten hours a sample was plated out and suspicious colonies were examined for morphology with dilute carbol fuchsin and, if necessary, for agglutination. All cases found carrying the vibrio were isolated.

Over 100 cholera-like vibrios were isolated during the researches; they produced little or no indol and were all non-pathogenic to animals, while some of them formed pigment. The value of agglutination, Pfeiffer's reaction and complement fixation in cholera diagnosis is discussed but nothing new brought forward.

The carriers isolated at the quarantine station excreted vibrios usually for a few days to two weeks or more; in one case, however, vibrios continued to appear up to the 54th day. If three examinations of faeces at intervals of two days were found negative, the patients were released from quarantine.

The actual cases of cholera treated were all found to have a high rectal temperature with remissions; the skin temperature was subnormal. The oscillations of the rectal temperature were equal to as much as six degrees in the day.

W. J. P.

TURNER (J. A.). **The Bacteriology of Cholera and its Relation to the Spread of the Disease from the Point of View of the Health Officer.** —*Proc. Second All-India Sanitary Conference.* 1912. Vol. 3. pp. 236–251. 1913. Simla: Govt. Central Branch Press.

The Bombay municipal laboratory examined a large number of samples of water, milk, foods, etc., from January to August, and some of their results are set forth in this paper.

A vibrio isolated from a well in a mosque is described; it gave all the typical reactions of the cholera vibrio, but was not agglutinated by the specific serum nor did it give Pfeiffer's reaction. In spite of this, however, the author concluded this well was infected with cholera. No endeavour was made to discover whether this doubtful vibrio had the specific agglutinogen. The author concluded that the vibrio changes in water so much as to become quickly unrecognisable, and suggests that during a cholera epidemic all water containing a vibrio should be held to be dangerous. Illustrations of the spread of the disease by personal contact are detailed. The account of the bacteriological methods employed in the laboratory shows nothing new. Many experiments on the variability of cholera germs in tap water are recorded in tabular form.

W. J. P.

SABELLA (P.). **Fisiologia e Patologia della Pelle nella Tossi-infezione Colerica.** [The Physiology and Pathology of the Skin in Cholera.] —*Giorn. Ital. d. Malat. Veneree e d. Pelle.* 1913. Oct. 30. Vol. 54. (Anno 48). No. 5. pp. 527-551.

The author treats of the disease as a toxic infection and endeavours

to account on this basis for the skin disturbances that arise. The skin eruptions observed by the author in a series of cases are described without anything very striking emerging.

W. J. P.

Balkan War Experiences.

Rosenthal (Franz). **Medizinische Eindrücke von einer Expedition nach Bulgarien, speziell ein Beitrag zur Diagnose und Therapie der Cholera asiatica.** [Medical Impressions of an Expedition to Bulgaria with Special Reference to the Diagnosis and Therapy of Cholera asiatica.]—*Berlin. Klin. Wochenschr.* 1914. Feb. 23. Vol. 51. No. 8. pp. 342–344.

In the autumn of 1913 the author had charge of a cholera hospital in Philippopolis. The hospital was of wood but quite well arranged and provided with a bacteriological laboratory. Rosenthal treated 283 cases of genuine cholera and had a mortality of 25·7 per cent. The patients were brought in a cab-like cholera ambulance, frequently from distances as great as 20 km. They were not infrequently moribund on admission.

About a quarter of the cases showed no or only trifling cyanosis. Some slight cases had the clinical appearances of ordinary enteritis without retraction of the abdomen, but still had the typical blood picture of cholera, to which latter the author attaches great importance, especially for early diagnosis. The cyanosed cases showed the ears, lips and nose deeply blue and cold, the skin shrivelled and inelastic, eyes sunken, conjunctivae reddened, voice hoarse and breathing superficial and quick. On the first day the cases showed usually complete suppression of urine. Pains and cramps of the extremities were a marked feature. In two of the cyanosed cases marked cyanosis of the penis was present; they were both fatal and showed post mortem marked bluish black inflammatory swelling of the mucous membrane of the large intestines and rectum. In the case of old people he saw many deaths result from relapses of diarrhoea—the stools however being free from vibrios during the relapse.

Rice watery stools were by no means uniformly present even in the severest cases; sometimes the stools were pasty, blood stained or coloured with blue. Tenesmus was only present in one case and lasted from the seventh day till death six days later. This case post mortem showed membranous formation in the large intestines.

In two cases, towards the end of the first week pneumonia developed. These showed no rise of temperature and ended fatally. Post mortem one was found to be a lobar pneumonia of the lower right lobe, the other a broncho-pneumonia affecting both lower lobes. In both cases marked pleurisy was present. Pleurisy alone was a frequent complication, especially on the right side. Suppurative parotitis, furunculosis, psychical disturbance of a paranoia-like character, corneal ulcer, skin rashes (3 cases of a papular character chiefly distributed in the regions of the elbows and buttocks) were amongst the complications met with. Post mortem, marked enlargement of the gall bladder, redness and swelling of the mesenteric glands, and local fibrinous peritonitis between the gall bladder and adjoining small intestines were frequently present.

Rosenthal found the blood picture in the early days of the disease extremely valuable in diagnosis. A very marked polymorphonuclear leucocytosis is present, the large lymphocytes are as numerous or more numerous than the small, and eosinophiles are absent. In treatment digitalis, camphor, adrenalin and saline solution were used, and for the coma, from which a fair number of patients died, 3 per cent solution of sodium bicarbonate was injected subcutaneously with marked success. The solution was not sterilised as some sodium carbonate is produced in that way with unpleasant results. This solution, in quantities up to one litre, was frequently given.

W. J. P.

AUMANN. **Ueber die Maassnahmen bei der Bekämpfung der Cholera in Serbien 1913.** [The Servian Anti-Cholera Campaign of 1913.] —*Berlin. Klin. Wochenschr.* 1914. Mar. 30. Vol. 51. No. 13. pp. 589-592.

Personal prophylaxis was the essential idea in the author's work. Prevent the organism entering the body and increase the resistance of the body to its attack.

House to house inspection was resorted to, in order to discover and isolate cases which were not notified. India-rubber gloves were used in examining and handling patients. Public notice of the danger of handshaking was issued. It was further enjoined that :—

(1). Pottery before being used should be washed in spirit and the surface disinfected by burning ; (2). Only such foods should be used as admitted of satisfactory sterilization ; (3). Diarrhoea was to be avoided, as far as possible, by suitable dieting ; (4). Acid drinks and lactic acid in tea should be used as weak internal disinfectants.

Vaccination was also largely practised.

House to house visitation to discover cases was resented, but was carried out with the assistance of the police. During this work two clinical signs were found to be of value in detecting cases which were convalescent (and ought therefore to have been isolated), *viz.*, an easily compressible pulse and a black coating of the middle third of the posterior portion of the tongue. The latter condition was most marked about the seventh to eighth day of convalescence. Friends were allowed to visit isolated patients quite freely, care being taken to prevent contact, and this familiarity with the treatment and the hospital soon won the confidence of the public.

For the isolation of the vibrio the author used peptone water enrichment. He condemns DIEUDONNÉ's plates but appears to betray ignorance as to how they should be used. Nothing of interest in the way of treatment appears in the paper.

W. J. P.

STRISOWER (Rudolf). **Meine Erfahrungen aus der Choleraepidemie in Serbien im Sommer 1913.** [Experiences in the Cholera Epidemic in Servia in the Summer of 1913.]—*Wien. Klin. Wochenschr.* 1913. Dec. 11. Vol. 26. No. 50. pp. 2079-2081.

The Bulgarian troops which were transported from Chataldja to Macedonia carried cholera with them. During and after the initial battles of the second Balkan War cholera appeared suddenly. After

the battle near Kirvolak 1,800 cholera cases were housed in Vieles, 1,800 in Uskub and 2,000 in Kumanowo and many more in similar centres. Probably the sudden character of the outbreak was due to the contamination of drinking water. No attention was paid to the provision of a good water supply and soldiers drank knowingly of contaminated streams. The mortality was enormous but exact figures were not forthcoming. Treatment was negligible in amount. Occasionally a little opium or heart stimulant was given but scarcely ever any saline injections. Bacteriological technique was as follows :—

Peptone water cultures from faeces were examined microscopically after six hours; if suspicious vibrios were seen, Dieudonné's agar plates were inoculated. The original peptone water cultures were used for microscopic agglutination after 18 hours; if positive with a specific serum in 1/800 the diagnosis was given as positive. In cases negative by this method microscopic agglutination was done with the colonies of the Dieudonné plate, or subcultures from the peptone water culture into fresh peptone water were made and examined for agglutination the next day, in impure culture.

The clinical histories showed nothing unusual. In the latter stages of the epidemic iodine, quinine and also permanganate of potassium were given as treatment, but the mortality rate remained high in spite of the use of these drugs. It was found, however, that the patients treated with permanganate were not so frequently chronic carriers of the vibrio. W. J. P.

Moustouses (Konstantin J.). **Die Cholerabekämpfung in der griechischen Armee während des griechisch-bulgarischen Krieges.** [The Anti-Cholera Campaign in the Greek Army during the Greco-Bulgarian War.]—*Der Militärärzt.* 1914. Mar. 7. Vol. 48. No. 4. pp. 65-71. [Ausgegeben mit Nr. 10 der *Wien. Med. Wochenschr.* 1914.]

During the Greco-Bulgarian War it was the custom to have the field hospitals provided with a separate cholera division, so that no mixing of wounded and cholera-infected soldiers occurred. The army was provided with a large number of field laboratories of the Lautenschläger pattern and in addition it had two principal laboratories, one stationary in Salonica and one movable. The duty of these principal laboratories was to supply media, vaccines and such like to the field laboratories and of course to do local bacteriological work. The disease never got out of control in the Greek army though, on forward movements being made to occupy territory vacated by the Bulgarians, explosive outbreaks took place occasionally. In one body of men 100 cases occurred in one day but, on removing the camp, only a few straggling cases continued to occur. The small explosive outbreaks were believed to be due to water contamination. Rogers's hypertonic saline was the chief treatment used and gave excellent results. A series of cases which had this treatment plus anti-cholera serum gave practically the same results as a control series with the saline treatment only.

Unlike Haffkine results, it was found that cholera vaccination (Kolle's vaccine) did diminish the case mortality. In a comparable series the unvaccinated showed a 34 per cent. case mortality, as against

a 20 per cent. case mortality in the case of those who had been twice vaccinated. It was further striking that only two staff officers and doctors refused to be vaccinated against cholera and these two were the only individuals to die of the disease in their respective ranks.

W. J. P.

ARNAUD. **Le Choléra dans l'Armée hellenique.**—*Bull. Acad. Méd., Paris.* 1914. Séance du Mar. 17. 3 ser. 78 année. Vol. 71. No. 11. pp. 384-386.

The number of cases of cholera that occurred in the Greek army during the second Balkan War was 1,801 with 348 deaths. 93,868 soldiers were vaccinated; of these 72,652 had two inoculations, and 21,216 only one dose of vaccine; 14,332 were not vaccinated even once. The incidence of cholera amongst the three groups was ·43, 3·12, and 5·75 per cent. respectively.

Anticholera serum (KOLLE) was not found of definite value in treatment. The low cholera incidence in the Greek army appears to have been due to the facts that:—1st, the personnel was well vaccinated; 2nd, the army was in almost constant movement and did not rest in any area liable to be contaminated; 3rd, other effective hygienic measures.

W. J. P.

TREATMENT.

LOEWY (Otto). **Choleratherapie durch Infusion hypertonischer Kochsalzlösung, Jodtinktur und hypermangansaurem Kalium.** [The Treatment of Cholera by Hypertonic Saline Solution, Iodine Tincture and Potassium permanganate.]—*Wien. klin. Wochenschr.* 1914. Apr. 16. Vol. 27. No. 16. pp. 467–470.

The author draws attention to the fact that hypertonic saline solution was recommended for the treatment of diarrhoea and cholera by GAERTNER and BECK in 1893. ROSNER, acting on their suggestion, in 1895 treated seven cases of cholera with four deaths; he used, however a 10 per cent. salt solution. ROGERS is credited with having actually demonstrated that the method when properly carried out is effective in markedly reducing the cholera mortality. The author experimentally examined the thesis of ROGERS to the effect that potassium permanganate destroyed the cholera toxin. He found this to be true; a lethal dose of toxin given simultaneously with the permanganate to experimental animals failed to kill.

An account of the treatment of 18 cases is then given, in which ROGERS's treatment was used and tincture of iodine as recommended by KRAUS. Three cases (16 per cent.) died, none during the acute cholera attack. The clinical histories of the cases do not show anything noteworthy.

W. J. P.

LUNN (W. E. C.). **Case of Cholera treated by Hypertonic Saline Infusion.**—*Jl. R. Army Med. Corps.* 1914. Apr. Vol. 22. No. 4. pp. 444–446. With 1 curve.

The patient was seized with vomiting, diarrhoea and cramps in the legs at 2 a.m. In the afternoon of the same day the motions were

almost continuous and forcible vomiting of green rice-watery fluid was frequent. Thirst was intense and the cramps much aggravated. Two and a half pints of hypertonic saline were given intravenously at 7 p.m. and immediately afterwards all his symptoms abated, pulse rate fell and the patient made an uneventful recovery.

W. J. P.

STUMPF (Julius). **Ueber Cholerabehandlung und Choleraprophylaxe auf Grund meiner Erfahrungen in Nisch und Belgrad.** [The Treatment and Prevention of Cholera in the Light of my Experiences in Nish and Belgrade.]—*München. Med. Wochenschr.* 1914. Apr. 7. Vol. 61. No. 14. pp. 759–763.

The paper is written in a semi-popular style. It details the experience of the author in using his own "Bolus" treatment on cholera patients. The treatment consists in giving large quantities of a special earth (Ton, Aluminium Silicate) in a relatively small quantity of water. It has been largely used in Germany for diarrhoea, food poisoning and the like. The author treated 30 cases in Nish from their first entrance into the hospital until the end of the case and every one was cured. One case, on the point of death when the author first entered the hospital, had the treatment and died. Some of the 30 cases which recovered had cholera of the most acute type. The author had also very good results in Belgrade and in the country. One gets the impression from reading the paper that the remedy is almost a specific. MERCK in Darmstadt supplies the bolus material in packets of 200 gm. each. The contents of one of these is suspended in 400 cc. of water and the patient made to drink it. If it is vomited a further dose is given, immediately after the vomiting, in continual small sips. Its effect is almost immediate.

W. J. P.

CANDIOTTI. **Le Transport Colloïdal des Médicaments dans le Choléra.** —*Arch. de Méd. et Pharm. Navales.* 1914. Mar. Vol. 101. No. 3. pp. 205–218.

A brief summary is given on the subject of the carriage of medicaments by colloids in various conditions of man and animals. The essential purpose of the paper is to give the results obtained by treating cholera and dysentery by injection of a colloidal complex of magnesium chloride and methylene blue. Dr. EVELPIDÈS, between the 25th October and the 31st December, 1912, treated 443 patients by this method, in a Greek hospital, with 121 deaths. Discarding the cases actually *in articulo mortis* on arrival at the hospital, the case mortality was 24·4 per cent. He treated a further series of cases (33) all believed at the time to be fatal, with only 11 deaths. This series was vitiated by the use of other treatments simultaneously.

Dr. RIQUOIR, the discoverer of the treatment, went to the East to test it. When it was used alone he had four deaths in a series of four cases treated. He found, however, that the addition of sublimate to the complex rendered it useful, as after this modification he had only one death in eight cases treated. Dr. Djemil SULEYMAN used the compound, without added sublimate, in the treatment of 50 cases of dysentery and had no deaths amongst them.

W. J. P.

BACTERIOLOGY.

GREIG (E. D. W.). **On the Vitality of the Cholera Vibrio outside the Human Body.**—*Indian Jl. Med. Research.* 1914. Jan. Vol. 1. No. 3. pp. 481–504. With 1 chart.

The author examined 94 samples of stools from cholera patients. These stools were of the typical rice watery character. They were kept in the dark, in conditions to prevent evaporation, and samples were examined each day to see when the contained vibrios died out.

The longest time they remained alive and recoverable was 17 days. The average time varied during the year, being longer in the cold weather and shorter in the hot weather: in February it was 7·7 days and in June 1·2 days. A series of tables is given showing the daily population of cholera vibrios in samples of rice watery stools under examination, but this is probably not very accurate. The bearing of these observations on the epidemiology of cholera is briefly reviewed.

W. J. P.

STAMM (Johannes). **Zur Frage der Veränderlichkeit der Cholera-vibrionen in Wasser.** [Alterations in Cholera Vibrios in Water.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1914. Jan. 15. Vol. 76. No. 3. pp. 469–542. With 2 plates.

The paper contains a large amount of new experimental work. Vibrios were passed through fresh spring water and river water a large number of times, the individual passage lasting about five days as a rule. The water to which the specific vibrios were added was not sterile, but alterations alleged to have occurred in the specific vibrios are quite satisfactorily proved in the majority of cases.

The most interesting results of all are those dealing with agglutination. Genuine strains, which agglutinated with dilutions of one in 20,000 of specific serum, after being passed through water failed to agglutinate with a dilution of one in 50. These new strains did not agglutinate with the serum of the original strain, but they did agglutinate with a serum produced by their injection into rabbits. It is exceedingly interesting that the sera so produced agglutinated not only the variants but also the original and other genuine cholera strains. That is, passage through water removes the power of reacting with the specific agglutinin, but the altered organism still retains the specific agglutinogenic property of genuine cholera strains. This work is important in so far as cholera-like vibrios found in water, which do not agglutinate, have been held by various workers to be saprophytic and not genuine cholera vibrios, but if Stamm's work be confirmed the non-agglutinating vibrios ought now to be further investigated and those that contain the specific agglutinogen may be safely reckoned as specific organisms.

The other variations dealt with are morphology, number of flagella, indol production and pigment production. The facts about the latter deal chiefly with the production of white pigment. Morphological variations are described as coccoid, spermatozoa-like, spiral forms and numerous other varieties.

A few experiments were done with sterile water and similar changes produced.

It took over two months to effect the removal of the agglutinating power by this method and it was only irregularly produced.

The nature of the changes are discussed without anything new being brought forward.

W. J. P.

Defressine (C.) & Cazeneuve (H.). **Sur la Persistance du Vibrion cholérique dans l'Organisme humain et dans quelques Milieux Extérieurs.**—*Arch. de Méd. et Pharm. Navales.* 1913. Dec. Vol. 100. No. 12. pp. 438-448.

Old epidemiological evidence is brought forward to show that cholera spreads along rivers, canals, quays, etc. The occasions on which the cholera vibrio has been found living in river and sea water are summarised, and the experimental evidence to show that it may survive a long time in impure sea water is discussed. The authors found that sea water (Toulon) inoculated with the *V. cholerae* and kept at 37° C. still showed living cholera germs after 15 days. A brief resumé of the literature on the effect of high concentration of salt on the growth of the cholera germ is brought forward to support the reasonableness of its long survival in sea water. The evidence of the authors that the cholera vibrio is able to thrive for long periods in fresh water is extremely interesting. Several vessels took fresh water from a common source at different times and from all these different samples of the same water cholera germs were isolated, in one case as long as 15 days after taking in the supply; moreover the number found compared with the number in the original supply showed that they had grown in the ships. The author states running water may remain infected for one month without reinfection occurring. Six months after the cholera epidemic in Toulon (1911) had ceased, the mud and slime from the bed of the local river were examined for cholera germs. These were found and cultivated and it appears probable to the authors that the bed of the river had remained contaminated for this period. Several other similar cases are cited.

W. J. P.

Flu (P. C.). **Onderzoekingen over de Agglutinabiliteit van Cholera-vibrionen mit de Galblaas van Choleralijders.** [On the Agglutinability of Cholera Vibrios isolated from the Gall Bladders of the Dead.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 6. pp. 808-831.

A brief resumé of 18 cases is given. The cholera vibrio was isolated from eight of them. 1 cc. of bile was added to peptone water in order to isolate the organisms. Three of the strains agglutinated badly with a specific serum. Two of these after ten passages on agar agglutinated well, but one still agglutinated only in a dilution of 1/200 though the titre of the serum was 1/10,000.

A comparison of the virulence of the strains isolated from the gall bladder and intestine respectively showed only trifling differences.

An attempt was made to remove the agglutinating power of genuine cholera strains by growing on bile, but with no marked success. It was found that growth on bile and immune cholera serum did diminish the agglutinating power.

W. J. P.

KABESHIMA. **On the Spontaneous Agglutination of Cholera Vibrios.** [In Japanese.]—[*Jl. of Bacteriology*, Japan. 1913. No. 216.].

The author worked under the guidance of Professor SHIGA in KITASATO'S Institute and concludes:—

1. It is not rare to see old cholera vibrios agglutinate spontaneously.
2. Cholera vibrios cultivated in an immunised serum bouillon agglutinate spontaneously.
3. The spontaneous agglutination of old cholera vibrios can be prevented by adding formalin.
4 & 5. Most of the spontaneously agglutinable cholera vibrios lose this characteristic in 0·1-0·2 per cent. saline solution and when cultivated on Kabeshima's agar media.
6. The agglutinin-fixing power of the spontaneously agglutinable cholera vibrio does not differ from that of the normal type of the vibrio.

M. Kumagawa.

GREIG (E. D. W.). **On the Cultivation of the Comma Bacillus from the Lung in a Case of Cholera.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 270-275. With 2 coloured plates.

The finding of the comma bacillus in the lung is interesting from three points of view. It supports the view that cholera is occasionally at least a septicaemia; it suggests attention to further preventive methods which have hitherto escaped notice; it affords an explanation of the pneumonia which occasionally complicates cholera.

The case recorded ended fatally on the third day of illness. The only facts suggesting respiratory trouble during illness were a quickening of the respiration to 30 per minute, and the presence of crepitations in both sides of the chest.

Post mortem: Oedema of right lung was found and smears, sections and cultures from it all showed the presence of the comma bacillus. The bacilli occurred in clumps in the smears, and were found in the alveolar spaces in the exudate in the case of the sections. The sections of the alveoli further showed many recently formed capillaries, an appearance which Greig has constantly found in experimental and natural cholera lesions. The bile of the case contained the cholera vibrio. Sections of the kidney showed comma bacilli.

W. J. P.

GREIG (E. D. W.). **The Precipitation of Bacterial Protein by Concentrated Salt Solution and its Relation to the Bacteriological Diagnosis of Cholera.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 276-293. With 1 plate.

LIEFMAN showed that the majority of cholera strains were strongly agglutinated in 90 per cent. magnesium sulphate solution, while only two out of 22 non-agglutinating vibrios were so agglutinated. Greig has examined this result, using as his material a large number of recently isolated strains of agglutinating and non-agglutinating vibrios. The agglutinating strains were derived from human sources, the non-agglutinating strains partly from human sources and partly from tanks in Calcutta. He found that of 176 agglutinating strains 164 were completely salted out in 90 per cent. magnesium sulphate solution, while the other 12 were salted out only in traces in this concentration. Of 41 non-agglutinating vibrios 27 were not salted

out at all by 90 per cent. magnesium sulphate, and eight only in traces, while six were fully salted out. Of these six non-agglutinators which were salted out completely, four were isolated from mild cholera cases and none of these four strains was able to call forth specific agglutinin on being used to immunise rabbits.

These results show that salt agglutination and serum agglutination show a close but not absolute parallelism.

W. J. P.

Penfold (W. J.) & Violle (H.). **A Method of Producing Rapid and Fatal Intoxication with Bacterial Products, with special reference to the Cholera Vibrio.**—*Brit. Med. Jl.* 1914. Feb. 14. pp. 363-366.

Under ordinary conditions intravenous injection of broth culture of *V. cholerae*, whether filtered or not, does not kill a rabbit, even in relatively large amounts (e.g. 2–3 cc. per kilo or more). This fact the authors confirm, and they show also that the rabbit will tolerate the intravenous injection of huge doses of freshly distilled water (1/30 of its weight per kilo), the addition of 1 or 2 c.c. of sterile broth making no apparent difference. If, however, a small dose of the cholera culture, e.g. 0·17 c.c. or less of whole culture or 0·5 c.c. of filtered culture, be given along with the distilled water, the result is rapid death, sometimes at once, usually within two hours. The same fatal result was obtained when the culture and the distilled water were given separately with an interval of 20 minutes to two hours, and equally whether the water or the culture was given first.

Similarly marked toxicity in presence of distilled water was obtained with cultures of *B. proteus*, *B. pyocyaneus*, *B. dysenteriae* (Shiga), *B. prodigiosus* and fowl cholera; and, while it was not obtained with anthrax, subtilis or pneumococcus, the authors state that they have not yet found a certainly negative result with any bacterial products. The poisonous action of potassium cyanide and strychnine was not made more acute by addition of distilled water.

Some evidence is adduced suggesting that the lysis of the red blood cells by the distilled water is an important factor in the augmentation of the toxicity of the bacterial cultures.

J. Henderson Smith.

Van Loghem (J. J.). **The Difference between Vibrio Cholerae and Vibrio El Tor.**—*Trans. xvii Intern. Congress of Med.* London. 1913. Section xxi. Trop. Med. & Hyg. Pt. 2. pp. 53-55.

The author disagrees with the view that the haemolytic differences between the El Tor vibrio and the Vibrio cholerae are rather quantitative than qualitative. The cholera vibrios, though they are unable to dissolve red cells in fluid media, produce on blood agar plates a clear transparent zone similar to that obtained with the El Tor vibrios; this fact has led to the view that the differences are rather of degree than of kind. If, however, goat red cells be used to add to agar plates, it is found that the zone produced by the El Tor vibrio appears quickly, is not absolutely clear, and shows a reddish tint, while that produced by the true cholera organisms appears more slowly, is absolutely clear and has a

greenish hue. Examined microscopically the El Tor colony zones give the spectrum of oxyhaemoglobin, while the cholera colony zones are entirely free of it. The El Tor vibrio is really haemolytic, while the cholera vibrios are rather haemo-digestive. This view is supported by the fact that, if cholera strains are arranged in haemodigestive capacity, they are also arranged in the order of their liquifying power in respect of gelatine.

Further, haemodigestibility is a very unstable power in the cholera strains, while haemolytic power is very stable in the El Tor vibrios.

W. J. P.

Rotky (Karl). **Immunisierungsversuche gegen den Vibrio El Tor.** [Experimental Immunization against the El Tor Vibrio.]—*Zeitschr. f. Immunitätsforsch. u. experim. Therapie.* 1. Teil. Orig. Mar. 10. Vol. 20. No. 6. pp. 644–672.

The experiments recorded in the paper support the view that there is an antiaggressin immunity produced in immunization with the vibrio and specific exudate. Further, by the treatment of guinea-pigs with *sterile exudate* only a serum is obtained which, after having all its antibacterial substances removed by passing El Tor vibrios through it, is found to protect guinea-pigs and mice against several lethal doses of the living organism. A purely bacteriolytic serum is of little use in protecting mice against infection. The results of the paper are similar to what has already been published on this subject.

W. J. P.

Drennan (Jennie G.). **A Non-Cholera Vibrio resembling the True Cholera Vibrio and a Pigment-forming Vibrio.**—*Jl. of Infectious Diseases.* 1914. Mar. Vol. 14. No. 2. pp. 251–254.

The two vibrios described were isolated at the quarantine station, New York in 1911.

The first one agreed with Koch's vibrio in its source (human faeces), morphology, staining reactions, motility, liquifying power on gelatine, aerobiosis, and in having only one flagellum. It gave, however, large moist slimy colonies on agar and only a slight cholera red reaction. It was not pathogenic to guinea-pigs and gave none of the serum reactions of cholera.

The second vibrio described gave large moist colonies on agar which gradually turned to a rich dark brown colour. The scum on alkaline peptone water was also similarly pigmented. The organism was a facultative anaerobe, liquified gelatine, slowly fermented glucose and saccharose but not lactose. It was slightly haemolytic and gave rise to a peculiar geranium odour on blood agar. It had one flagellum but produced no indol.

W. J. P.

Defressine & Cazeneuve (H.). **Vibrions cholériques et paracholériques. Vibrions des Moules des Parcs de Brégaillon.**—*Arch. de Méd. et Pharm. Navales.* 1914. Jan. Vol. 101. No. 1. pp. 46–55; and Feb. No. 2. pp. 103–119.

The paper deals chiefly with the paracholera vibrios found in mussels and other shell fish. Two terms are defined early in the paper.

"Paracholera vibrios" are those non-agglutinating vibrios coming from surroundings not tainted by actual cholera, while atypical cholera vibrios are those non-agglutinators which are isolated from a contaminated environment. This obviously is only a provisional arrangement.

The shell fish examined were collected 400 yards from the River Neuve, which had been shown to be contaminated with genuine cholera organisms. In 20 per cent. of the mussels examined a definite type of vibrio was found. These vibrios agreed with the Vibrio cholerae in morphology, type of movement, non-Gram staining, in liquifying gelatine, colony characters, complement fixation, fermentation properties and coagulation of milk (after 48 hours) with subsequent solution of the clot. The fermentation tests were carried out in a long series of sugars. These organisms were virulent for guinea-pigs and the pigs dead of the experimental infection showed the organism in the bile. The dead organisms were highly toxic to rabbits. The characters in which the organisms differed from the true cholera vibrio were :—1st. Inability to reduce nitrates to nitrites. 2nd. Marked haemolytic power. 3rd. Inability to agglutinate with a specific serum or to give the Pfeiffer reaction. The authors discuss two hypotheses: either these organisms are a specific mussel vibrio of paracholera character or they are atypical cholera vibrios. Naturally enough they have difficulty in coming to any definite conclusion.

The second part of the paper is a resumé of work recently done on the subject. Especial attention is given to a dictum of Crendiropoulo who examined samples of faeces of 34,461 passengers from infected countries with a view to the discovery of cholera carriers. After an examination of a large number of agglutinating and non-agglutinating vibrios derived from these and other sources he concluded: "Every carrier of vibrios, who comes from an infected or suspected country, ought to be treated as suspect, irrespective of whether the vibrio isolated agglutinates with a specific serum or not, and conversely every carrier of vibrios from an uncontaminated locality must be looked upon as harmless likewise, irrespective of whether the vibrio isolated agglutinates or not."

W. J. P.

Klimenko (W. N.). **Zum Befunde choleraähnlicher Vibrionen bei Kindern.** [Cholera-like Vibrios found in Children.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1914. Feb. 25. Vol. 73. No. 2. pp. 127–134.

In 1913 the author examined smears of the stool of a young female scarlet fever patient and found that 40–50 per cent. of all the organisms present were vibrios. Plated out on agar about half the colonies were composed of vibrios. Tested against cholera serum no specific agglutination resulted.

This vibrio was fully tested and agreed with the classical type in all morphological and cultural characters, but it was not virulent for either the guinea-pig or pigeon. The patient's serum taken on the 9th day of illness failed to agglutinate the strain. In the scarlet fever ward of the hospital several of the patients had slight diarrhoea at the time, so that it seemed advisable to examine a series (30) for the presence

of vibrios in the faeces. By the use of enriching methods and Dieudonné's agar three cases were shown to be excreting vibrios and these were found identical with the above described variety. Twenty-nine further samples of faeces from scarlet fever (19), diphtheria (8), and normal cases (2), were examined for vibrios and all showed them in the smears, but from none was it possible to isolate the strains.

The serum reactions of the above four strains were interesting. None agglutinated with a cholera serum. None produced a serum on injection which agglutinated each other to the full titre of the respective sera. Complement fixation showed that none of the sera of the patients from whom these strains were isolated contained specific antibodies to the strains.

The main point insisted upon in the paper is that a sample of faeces may show enormous numbers of vibrios and still this may be in no way related to cholera infection of the individual.

W. J. P.

Flu (P. C.). **Een Cholera-achtige Vibrio als verwekster van een Klinisch op Echte Asiatische Cholera gelijkend Ziekteproces?** [A Cholera-like Vibrio as the Cause of a Disease simulating Cholera.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1913. Vol. 53. No. 6. pp. 771–713.

A patient, in the beginning of an epidemic of cholera, was admitted to hospital with a cholera-like attack; she died in the algid stage of the disease. The motions were typical of cholera and on plating out on Dieudonné's agar a vibrio was obtained which was not the *V. cholerae*. A serum made by means of the vibrio did not bind complement with any of three cholera strains tested, but did with the strain used to make the serum. The strain did not agglutinate in 1/50 dilution of a cholera serum with a titre of 1/10,000. The haemolytic properties of the strain are described.

W. J. P.

Lamas (L.). **Estudio de Vibriones.** *Vibrio freseris* **nov. sp. y** *Vibrio vendrellensis* **nov. sp.**—*Boletin Instituto Nacional de Higiene de Alfonso XIII.* 1913. Dec. 31. Vol. 9. No. 36. pp. 173–210. With 1 coloured and 2 black and white plates.

In the spring of 1911 an epidemic of genuine cholera appeared in Spain. In the autumn of the same year a cholera-like disease appeared in the district surrounding Barcelona. From two of the cases two vibrios were isolated, while a third was isolated from a local river. The author compares these three organisms with each other and the *V. cholerae*.

The two organisms from patients were isolated in Vendrell and Gerona respectively. They showed close affinity with each other on agglutination and complement fixation tests being applied, while they appeared to be entirely different from the river vibrio and also the true cholera control strain.

The river vibrio had apparently no serological relationship with the cholera vibrio. The morphology and all biological characters are described in detail.

W. J. P.

Gloster (T. H.). **Notes on Vibrios isolated from Various Sources in Bombay during the Recent Outbreak of Cholera.**—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3. pp. 252–264. 1913. Simla: Govt. Central Branch Press.

Vibrios obtained from actual cholera cases :—

1st case. Stool of 11th day of illness yielded a vibrio which did not agglutinate with a cholera serum in 1/50 dilution. The serum of this patient the 16th day after onset did not agglutinate his own vibrios in 1/10 dilution even, but did agglutinate an actual cholera strain in dilution 1/300.

2nd case. A non-agglutinating vibrio was obtained on the 8th and 11th days of illness. The patient's serum of the 11th day of illness did not agglutinate the vibrio isolated from her own stool.

3rd and 4th cases yielded vibrios which did not agglutinate with a specific serum in 1/50 dilution. The serum of the 3rd case never agglutinated the vibrio isolated from this case in higher dilution than 1/10. The serum of the 4th case on the 7th day of illness agglutinated the vibrio isolated from the case in a dilution of 1/20 but no higher.

From wells, one tank, sewage and a cockroach similar vibrios were isolated.

The cultural characteristics of all these strains are given and compared with the results obtained with agglutinating strains. On peptone water after 24 *hours* a scum occurred in the case of the non-agglutinators but not in the case of the agglutinators. The fermentation properties of the two groups showed no constant differences.

Repeated subculture on agar for three months did not definitely increase the agglutinating power of any of the non-agglutinating strains. The agglutinating strains all failed to haemolyse goats' blood, while the non-agglutinating strains had this power. Both varieties haemolysed human blood. Complement fixation tests of the two groups against a cholera serum showed the agglutinators to give a positive result while the non-agglutinators gave a negative result. The author concludes that, if we accept the variability of the agglutinating power of *V. cholerae* as a fact, still the haemolytic differences between the two groups suggest that the non-agglutinators are not really derived from true cholera vibrios.

W. J. P.

Ionesco-Mihaesti & Ciuca. i. **Sur une Race particulière de Vibrions cholériques.**—*Compt. Rend. Soc. Biol.* 1914. Feb. 27. Vol. 76. No. 7. pp. 310–312.

ii. **Sur Certains Caractères Biologiques du Vibrion Jamboli D.M. 310.**—*Ibid.* pp. 312–313.

i. This organism was at first a non-agglutinating vibrio but after six passages on agar it became agglutinating. In Pfeiffer's reaction many unlysed forms were still present in the peritoneum after two hours, in spite of the use of a large amount of the specific serum. The strain was strongly haemolytic to sheep's red cells. It produced an oxydase and a tyrosinase, which in tyrosin-containing solutions produced marked pigment formation.

ii. In the Bulgarian cholera epidemic the authors found three non-agglutinating strains out of 16. One of these three strains was a

pigment former and on that account it is fully described. The strain was obtained post mortem from the small intestine of a soldier. The case had been of a somewhat chronic type, death taking place on the sixth day of the disease, from uraemia. Smears from the intestine showed only long vibrionic forms.

The vibrio was isolated from the scum of a peptone water culture and its three first cultures would not agglutinate with the anti-cholera serum of the Pasteur Institute of Paris. Morphologically, this strain is peculiarly long, 10–12μ; it shows involution forms early and it possesses only one cilium. It is highly motile. It forms a scum on broth and alkaline peptone water in 8 to 10 hours at 37° C. and later a deposit falls. The colour of the culture changes from yellowish to reddish brown. The strain liquifies gelatine rapidly and this medium also takes on a brown colour. On agar it gives whitish colonies and gradually the medium becomes brown. If grown on peptone water covered with paraffin a thin pellicle forms between the peptone water and paraffin and after a few days the growth commences to mount up the tube; under these conditions however no pigment is found. Apparently the pigment formation requires a good air supply.

W. J. P.

CANTACUZENE (J.) & MARIE (A.). **Choléra gastro-intestinal expérimental chez le Cobaye.**—*Compt. Rend. Soc. Biol.* 1914. Feb. 27. Vol. 76. No. 7. pp. 307–310.

This paper contains evidence of the production by feeding of cholera in the guinea-pig. The animals were experimented on in groups of six. The group was first deprived of food for 24 hours. Then they all received a dose of soda bicarbonate and afterwards each of four received ·01 to ·02 of a gram of podophyllin and a third of an agar slope of cholera culture of 18 hours. The other two were used as controls, one receiving the podophyllin alone and the other the agar culture. 83 per cent. of animals so treated with podopyllin + cholera culture died in from 7 to 48 hours, and the rest (17 per cent.) showed marked illness. Hypothermia was a marked clinical feature and frequent motions occurred, first bile stained. The motions swarmed with vibrios. Post mortem, congestion of the stomach, small intestine and caecum was found. The intestinal contents were blood-stained and watery, with rice grains. In the lower portion of the ileum small ecchymotic ulcers were present.

In 75 per cent. of the cases the urinary bladder was entirely empty. Those animals which survived about 40 hours showed marked congestion and enlargement of the suprarenals and kidneys. The latter showed haemorrhagic infarcts. Fatty changes were present in the liver. The lungs were flattened and shrivelled up as in human cholera. The vibrios were usually isolated from the intestine post mortem, but in only one case could they be grown from the heart blood or bile. If the animals had been 24 hours without food and bicarbonate of soda and vibrios only had been given without podophyllin, 12 per cent. died. If the animals had been having ordinary food, no deaths resulted.

These experiments are vitiated slightly by the fact that the dose of podophyllin given was high, up to ·02 gm., while the authors admit

·03 is toxic. Moreover two animals which received podophyllin alone had diarrhoea and died. These deaths are explained by the authors as cholera from contact infections.

W. J. P.

PREVENTION.

HARRISS (S. A.). **The Effect of Pipe Water Supplies on the Reduction of Cholera in Urban Areas.**—*Proc. Second All-India Sanitary Conference.* 1912. Vol. 3. pp. 204-212. 1913. Simla: Govt. Central Branch Press.

A table is given showing the mortality from cholera in the towns of the United Provinces before and after the provision of a water supply. A three year period after the introduction of such a water supply appears to be necessary before the people take full advantage of it, very largely owing to the fact that pipe water in the hot season becomes very hot, quite frequently reaching a temperature of 98° F. The number of years in which cholera appeared in the different towns considered did not diminish, but the maximum mortality in any given year dropped enormously after the introduction of the supply. The death rate per thousand was in some cases never above one after the introduction of these supplies, and in other cases very rarely, while before it had been quite frequently above one. In endeavouring to explain why cholera has not entirely disappeared after the introduction of a water supply the following points are considered seriatim :—

(1) Other sources of water supply.
(2) The class of people inhabiting the town.
(3) Is the town a pilgrim centre ?
(4) Is the pipe supply continuous or intermittent ?
(5) Has the maximum mortality any relation to the prevalence of cholera in the district ?

In reference to the second of the above points a larger Hindu population is found not to increase the cholera death rate. In the case of Benares, a large pilgrim centre, the introduction of the water supply reduced the average death rate by more than one half, but its cholera death rate remained unduly high. The maximum mortality in the towns bears no definite relationship to the prevalence of cholera in the corresponding districts. The influence of wells is dealt with very fully, and it is suggested that the linking up of latrines and house drains with the sewers, where these are present in towns, is urgently required.

W. J. P.

GREIG (E. D. W.). **Observations on Disinfection in Cholera.**—*Proc. Second All-India Sanitary Conference.* 1912. Vol. 3. pp. 200-203. 1913. Simla: Govt. Central Branch Press.

The report deals with the influence of thorough disinfection of the faeces in controlling two cholera epidemics. The first was a jail epidemic in Puri; 17 cases occurred with five deaths. All latrines were kept filled with cyllin solution so that no fly infection was possible; four days after this measure was taken no further cases occurred.

The second epidemic dealt with was that of the town of Puri itself. Chlorinated lime was the disinfectant used, as it is cheap and a good bactericide and its pungent odour keeps flies away. Its systematic use commenced on August 16th, and five days afterwards a very marked falling off of deaths occurred. A table of figures is given. The two experiences taken together suggest that this is a highly important part of the prophylaxis.

W. J. P.

KNAPTON (H. A. F.). **Some Practical Points in Dealing with Epidemics of Cholera.**—*Proc. Second All-India Sanitary Conference.* 1912. Vol. 3. pp. 214-219. 1913. Simla: Govt. Central Branch Press.

The author discusses the various methods of transmission of the disease from person to person. In the central division of the Bombay Presidency when cholera breaks out in a village, a form for particulars of each case is filled in by the village scribe and sent to the Sanitary authority from which conclusions as to the nature and origin of the case are drawn. Attention is drawn to the difficulty arising from epidemics of severe diarrhoea probably of a ptomaine poisoning character. One such epidemic occurred in a Deccan Village; 100 persons were affected with the disease but all recovered. Printed instructions are issued as to how to check the spread of cholera and an officer is required to see that these are carried out. The success of a scheme depends chiefly on the effectiveness of the supervising officer (Mamlatdar). An account of three small epidemics is given and the success of guarding the water supplies, burning the motions and the free use of disinfectants illustrated. All the officials touring cholera districts were required by the author to take dilute hydrochloric acid in their drinking water, 30 mins. to the oz., and none of them ever contracted the disease.

W. J. P.

DUNN (C. L.). **Proposed Measures for Dealing with Cholera Epidemics in the United Provinces.**—*Proc. Second All-India Sanitary Conference.* 1912. Vol. 3. pp. 220-234. 1913. Simla: Govt. Central Branch Press.

In 1910–1911 the epidemics of cholera in the United Provinces were severe and did not yield readily to preventive methods. This appears to have been due to former defective government regulations, which resulted usually in three weeks elapsing after the commencement of the epidemic before the wells were disinfected.

New official regulations as to procedure in times of epidemic are given as an appendix to the paper. The new regulations do not show anything unusual from the hygienic point of view. Experiments are given showing the results of endeavours to disinfect, by means of potassium permanganate, raw and sterile water, to which cholera germs have been added. From these it appears that one ounce of permanganate per 2,000 gallons of water is sufficient for the disinfection of ordinary wells.

W. J. P.

Bishop (T. H.). **The Working of the Cholera Prevention Scheme on the Lower Ganges Bridge Construction.**—*Indian Jl. Med. Research.* 1913. Oct. Vol. 1. No. 2. pp. 294-309. With 1 map.

The scheme was planned to diminish the liability to cholera of the labourers working on the construction of a railway bridge over the Lower Ganges.

(a) *Preventive.* An educational campaign was carried on in each of the districts. House to house visits were paid and lectures given weekly in Bengali in schools and halls. All available information was collected likely to bear on the subject. A large amount of effort was expended in improving the village water supplies, effected usually by introducing deep tube wells. The difficulty of doing this, the cost of introduction and maintenance, and the value of the work are fully set forth and the distribution of the tube wells amongst the different villages is shown on a chart. The tube well was expensive in respect of upkeep, but this was due to ignorant and wilful damage. The wells varied from 18 to 128 feet deep and replaced the Pot wells common in Bengal, which though 20-30 feet deep have walls made of jointed rings of earthenware so that they are quite pervious. The disinfection of wells was carried out locally by chloride of lime according to a formula given in the paper. It succeeded in making the water so nasty that it was avoided by the people.

(b) *Curative.* In treatment hypertonic saline injections were largely used, but they were given into the peritoneal cavity, 80 ounces for an adult and 40 ounces for a child. The intravenous method was found difficult in the bad circumstances of the patients and subsequent comparison of the relative values of the two methods has resulted in favour of the intraperitoneal route (Campbell Medical Hospital, Calcutta). Parke Davis & Co.'s pituitary extract was given at the commencement of the cases, 20m every four hours. In 1913 of 38 cases treated none died.

W. J. P.

Pathology.

Ciaccia (Matteo). **Pathologisch-anatomische Beobachtungen über einige Fälle von Cholera asiatica.** [Observations on the Pathological Anatomy of Some Cases of Cholera.]—*Centralbl. f. Bakt.* 1. Abt., Orig., 1914. Mar. 21. Vol. 73. No. 3. pp. 161-169.

The author examined 148 cases post-mortem and paid special attention to three characteristic post-mortem conditions, one of which has not been described before.

The first was the condition of the skin. The skin was found stiff and, on trying to pinch it up into folds, it gave the impression of being united to the underlying structure. The author speaks of this as the "skin sign." It has nothing to do with the fact that the skin stands in folds if pinched up during the disease. The post-mortem skin sign was got all over the body, but best in those areas where the skin normally is most easily raised into folds. It is not due to removal of fluid from the subcutaneous tissue. It occurs in cases in which the disease has been of very short duration, where no diarrhoea had occurred. It appears to depend on increased rigidity of the muscular and fibrous structures of the skin and subcutaneous tissues. The

sign enabled the author to determine that three cadavers believed to be those of cholera patients were nothing of the sort. This opinion was confirmed by the subsequent post-mortem and bacteriological examinations.

The other two conditions specially attended to were the peculiar focal fatty changes found in the liver, especially in the left lobe and near the falciform ligament, and the fatty changes found in the cortex of the kidneys. The two latter conditions are well known.

The author discusses various theories as to the nature of the intoxication and the bearing of the post-mortem findings on these.

W. J. P.

Michailow (Sergius). **Pathologisch- und anatomische Untersuchungen der feineren Struktur der Gehirnrinde, der Rinde des Kleinhirns, des verlängerten und des Ruckenmarks des Menschen bei asiatischer Cholera.** [Pathological Histology of the Cerebral Cortex, Cerebellar Cortex, Medulla and Spinal Cord in Cholera.]—*Arch. f. Psychiatrie u. Nervenkrankht.* 1913. Vol. 51. No. 2. pp. 587-687. With 8 plates.

In the central nervous system in early cholera, congestion of the blood vessels, swelling of their endothelium and hyaline degeneration of their walls occur. Small haemorrhages also supervene and pigmentary deposits may be left by them. By the end of the first week, leucocytes appear in the pericellular lymph spaces. From the third day of the disease the ependyma of the central canal of the cord proliferates. Changes in the neuroglia, in cholera, are not very certain or definite. From the third day of the disease scattered degeneration of nerve fibres in the nerve roots and cord appears. The degeneration depends on destruction of the nerve cells and also on direct action of the cholera toxin. The albuminous degeneration of nerve cells is most marked about the third day of the disease. Microorganisms are present round the degenerated nerve cells from a very early stage. The degeneration of nerve cells is shown by swelling, defective staining capacity and ultimate shrinking of the cells, etc. The vibrios are found frequently in the central nervous system. The paper is full of experimental detail and is worthy of close study.

W. J. P.

Millous. **Observations d' Entérite à Forme pseudo-cholérique avec Présence de Protozoaires.**—*Ann. d'Hyg. et Méd. Colon.* 1913. Oct.-Nov.-Dec. Vol. 16. No. 4. pp. 1174-1177.

Three cases of acute cholera-like attacks are described. They lasted a few days and none were fatal. Acute diarrhoea with mucus and blood in stools, vomiting, rigors, fall of temperature, quick thready pulse, sunken eyes and cold clammy sweats were the chief signs. The faeces in each case were examined and showed no vibrios in microscopic smears; they showed amoeba and in addition a small protozoon of elliptical form about 9–10μ long.

W. J. P.

Mendoza (A.). **Nota acerca del Cólera experimental en el Mono.** [Experimental Cholera in the Monkey.]—*Boletin del Instituto Nacional de Higiene de Alfonso XIII.* 1913. Sept. 30. Vol. 9. No. 35. pp. 117-130.

This short note simply recalls the fact that the author by the previous administration of alkalies was able to induce cholera with the specific vibrio when the latter was given to a monkey by the mouth. He published his work in 1886 and he suggests it has escaped the notice of recent workers.

W. J. P.

Canstatt (Laura & Tony). **Choleraerfahrungen und ärztliche Tätigkeit eines berühmten deutschen mediziners (Dr. Carl Canstatt) in Belgien.** [The Cholera Experiences and Professional Life of a Celebrated German Physician in Belgium, Prof. Dr. Carl Canstatt.] —*Janus.* 1914. Jan.–Feb. Vol. 19. pp. 1–16.

The subject of the article, Prof. Canstatt, lived in early life in Regensburg and at the time of the cholera epidemic of 1831 went to Paris to study the disease. When the epidemic diminished he journeyed to Brussels and shortly afterwards this town was severely attacked by cholera. He worked hard there for four months during which time he contracted a slight attack of the disease. The disease then spread into the country districts of Belgium and again Canstatt received an appointment to an infected centre, where he organised a hospital and remained there till the abatement of the epidemic. His treatment of cholera is rather interesting in so far as he recommended intravenous saline injections. The biography gives many interesting details of hospital arrangement and cholera treatment of the period.

W. J. P.

LEPROSY.

NETTER (Arnold). **Rapport relatif aux Mesures spéciales de Prophylaxie qu'il conviendrait de prendre dans la France continentale à l'Egard de la Lèpre, au Nom d'une Commission, composée de MM. Balzer, Blanchard, Gaucher, Hallopeau, Roux, Widal et Arnold Netter.**—*Bull. Acad. Méd. Paris.* Séance du 27 Jan. 3 ser. Vol. 71. (78e année) No. 4. pp. 98-125; et Séance du 3 Fev. No. 5. pp. 176-186. [Discussion.]

The Minister of the Interior having called upon the Academy of Medicine for its opinion upon the question of the compulsory notification of leprosy in France and for advice as to the measures necessary to prevent the spreading of that disease from infected persons, the subject was considered by a committee composed of MM. BALZER, BLANCHARD, GAUCHER, HALLOPEAU, ROUX, WIDAL, and Arnold NETTER.

At a meeting on Jan. 27, 1914, Dr. Netter communicated to the Academy the results of the deliberations of the committee, together with a report addressed to M. MIRMAN, Director of Public Health, on the prophylaxis of leprosy.

The committee considers that the Academy should avoid attempts to formulate the text of a law for the suppression of leprosy and should confine itself to indicating what it regards as the fundamental principles on which such a law should be based. The situation would appear to be as follows:—

In 1903, when the Council of Public Health and the Academy of Medicine were asked, under Article 4 of the Law of February 15, 1902, to draw up a list of compulsorily notifiable diseases, neither of these scientific bodies was in favour of including leprosy on the list. In more recent years, the number of sufferers from this disease actually resident in France has increased, and the question of special measures to prevent the infection of healthy persons has come to the front.

It is open to question whether an instrument legalising the compulsory notification and isolation of lepers does not exist in the Law of 1822 dealing with "*maladies pestilentielles*" since, though hitherto this law has been held to apply only to cholera, yellow fever, and plague, it may be maintained that leprosy is also a "pestilential disease" and capable of inclusion under this heading. There are many reasons, however, for preferring a special law for the suppression of leprosy if legislation is held to be necessary.

The deliberations of the Committee are arranged under the following headings:—(1) Present state of leprosy in France. (2) General question of contagion in leprosy and present opinions as to its methods of spread. (3) Contagiousness of leprosy in France. (4) Necessity of preventive measures against leprosy in Continental France. (5) Conditions which should be fulfilled by a law against leprosy. (6) Conclusions.

The report is what might be expected from Dr. Arnold Netter, a valuable and lucid examination of the whole question of leprosy in modern France. In the year 1225 there were no less than 2000 Leprosoriums in that country. With the remarkable diminution of the disease in Europe which marked the latter part of the Middle Ages (a diminution that is too readily attributed to successful isolation

and which still deserves careful examination by epidemiologists), these institutions became unnecessary and were converted to general hospital uses in 1693 by Louis XIV. Leprosy continued as a gradually diminishing quantity in Provençe, Languedoc, Poitou, and Brittany up to recent times, but by the end of the nineteenth century the disease was confined to a single focus in a series of small villages situated in the mountains in the Department of Alpes-Maritimes. While this focus still persists, and occasionally initiates a fresh case amongst persons intermarrying or having intimate relations with its inhabitants, by far the greater number of the lepers now in France are imported cases infected in endemic regions of the French Colonies or elsewhere, South America contributing a large number of persons who come to France for treatment. The possibility of transmission of leprosy from the infected to the healthy both in France and in the rest of Europe is demonstrated by the citation of several authenticated cases, most of them classic instances that are invariably quoted in this connection.

Of great interest are the cases arising in persons who had never left France and with whom it has been impossible to prove previous contact with a known case of leprosy. Of these, eight undoubted instances are on record, one from Paris, five from the Departments of the North and of Pas-de-Calais (LELOIR), one from the Vosges (BERNHEIM) and one from Lorraine (ETIENNE).

[These cases are important since the prolonged and intimate contact, usually regarded as necessary in the transmission of leprosy, could hardly have occurred without having being discovered unless indeed they were infected by intimate contact with a "carrier" as opposed to a "case" of the disease. It is this possibility which lends a special importance to such instances.]

Lack of space forbids more than a summary of the conclusions of the committee, which, with the report, should be studied in the original by all interested in the subject. The main points are as follows :—

1. The contagion of leprosy is minimal in the absence of cohabitation and prolonged and intimate contact, provided that elementary measures of personal and general cleanliness are observed. It is therefore unnecessary to isolate in special institutions persons who are in a position to realise hygienic conditions in their own homes.
2. On the other hand, mendicants and vagabonds and all persons so situated as to be capable of disseminating the germs of the disease are to be regarded as "dangerous" and should be isolated in special institutions.
3. Entry to French territory should be forbidden to lepers of foreign nationality.
4. Persons suffering from leprosy in a form incapable of infecting others for the time being must be subject to medical inspection, must notify changes of address, and should be excluded from schools and from the exercise of certain occupations.
5. A similar medical inspection should be obligatory for persons who have lived in the same house with lepers.
6. Capable medical men familiar with the necessary technique must verify the diagnosis in all cases of leprosy notified to the authorities and must, further, indicate the measures to be taken and see that these are carried out.

The Discussion on Dr. Netter's report took place at the meeting of February 3, 1914. M. GAUCHER pointed out that it was he who, in the face of great opposition by the Academy of Medicine, had raised the whole question of the need for fresh legislation against

leprosy. The discussion appears to have taken rather a personal turn, and adds very little to the case for or against the need for special measures in the suppression of the disease. On the motion of M. PINARD, the report was returned to the committee for further consideration and alterations, in view of new observations which were alleged to have been brought forward.

S. Lyle Cummins.

SCHMITTER (Ferdinand). **Leprosy in its Relation to Treponematous Disease.**—*Military Surgeon.* 1914. Apr. Vol. 34. No. 4. pp. 311-315.

This short but important communication records the systematic examination of 25 volunteers from amongst the lepers at the San Lazaro Hospital, Manila, to ascertain the proportion giving a positive Wassermann reaction.

The following examinations were carried out in each case —

(1) Examination for clinical signs of leprosy. (2) Search for leprosy organism. (3) Examination for suggestion of treponematous disease, syphilis or yaws. (4) Wassermann reaction. (5) Luetin reaction. (6) Antisyphilitic treatment. (7) Observation of results of treatment.

The results are tabulated in brief. The patients were male Filipinos except one Chinaman. In two the findings as to leprosy were doubtful, so the Wassermann reaction was applied in two other certain cases to complete the 25.

Findings.—Wassermann.		Luetin reaction.	
+ +	15 or 60 per cent.	+ +	3 or 12 per cent.
+	5 or 20 per cent.	+	12 or 48 per cent.
±	4 or 16 per cent.	±	7 or 28 per cent.
−	1 or 4 per cent.	−	3 or 12 per cent.

Combining the two reactions, evidence of treponema infection was found in 100 per cent. of 25 cases. Under treatment with salvarsan there were many instances of improvement though none of cure. The treatment could not be persisted in owing to the transfer of the patients to Culion Island.

[The author's deduction that leprosy is due to a combined infection with HANSEN's bacillus and a treponema is not justified in view of the small number of cases examined. The percentage of Wassermann and Luetin reactions in an equivalent group of non-leprous male Filipinos of the same class would be of use in assessing the significance of the results. There are many reasons why male lepers might be expected to show a high incidence of syphilis, apart from the congenital taint so likely to prevail in the class from which the majority of lepers is drawn. The author has certainly made out a case for a thorough examination of lepers from this point of view.]

S. L. C.

LEBOEUF. **La Lèpre en Nouvelle-Calédonie et Dépendances.**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 177-197.

The lepers in New Caledonia fall into certain categories on social

grounds, each class requiring its own conditions of isolation. Amongst the Europeans a fairly large number of cases arises, the larger proportion being from the convicts and ex-convicts of the penal settlement. The natives and coloured immigrants also suffer considerably from leprosy. Much of the article under review is occupied with local questions of administration arising out of the problem of isolation. In addition, there are some notes as to the researches made by the author, of which a summary is as follows :—

1. Rat leprosy occurs in New Caledonia. The bacillus is easily distinguished from HANSEN'S bacillus and corresponds in every respect with the bacillus of STEFANSKY.

2. Careful examination of five persons living in contact with lepers has supported the opinion of MARCHOUX that acid fast bacilli can be found in the superficial lymphatic glands in man as in rats.

3. In endemic countries, there are probably many infected persons who are clinically healthy, only the markedly leprous persons appearing in the statistics.

4. Experiments with ticks, mosquitoes, bugs, and lice have all proved to be negative. *Musca domestica* can, however, absorb enormous numbers of lepra bacilli by feeding on ulcers, etc., these bacilli being voided in the faeces. It is only the open cases of leprosy that are dangerous in this way. With regard to the question of how far a fly can actually carry infected material, 23 flies captured in a house 150 metres distant from an Infirmary, where advanced lepers were under treatment, were none of them found to be infected. Dissemination by flies can therefore only occur within a very limited zone around the sick.

5. Much more discretion might be used in exempting from isolation certain cases of leprosy that are obviously not infective.

In a coloured population of 26,000 there are now 652 lepers. Amongst the Europeans 106 cases are from free persons, and 106 from amongst the convicts, the proportion, however, being much higher amongst the latter.

S. L. C.

LEBOEUF (A.) & SALOMON (E.). **La Lèpre en Nouvelle-Calédonie. i. Nombre et Distribution géographique des Lépreux. ii. Marche de la Maladie dans l'Archipel. iii. Organisation de la Prophylaxie.** —*Bull. Soc. Path. Exot.* 1914. Mar. Vol. 7. No. 3. pp. 218-232.

This article develops the theme introduced in the paper above quoted and adds considerably to the information furnished. The percentage of lepers in each tribe amongst the inhabitants of each island is tabulated. In a total native population of 28,000 there is a percentage of 2·6. In the foreign population, consisting chiefly of Europeans but with a few Arabs, Japanese and Tonkinese, there are 211 cases known amongst about 17,000 persons. The percentage of lepers amongst the penal element of the European community is twice that amongst the free inhabitants of the Colony, and it seems clear that the latter have been considerably infected by the former. In examining the numbers of natives infected in different regions since the introduction of the disease 60 years ago a very important fact comes to light, namely that in the regions, such as Oubatche, infected earliest, the disease has passed its maximum both of incidence and severity of type and is now diminishing, whereas in the more recently infected regions, such as the island of Ouvéa, the disease still keeps to its maximum of severity. [This observation,

so closely comparable with recent facts as to the distribution and type of tuberculosis in primitive and recently infected communities, is of such importance as to demand further investigation elsewhere.] In dealing with the question of preventive measures, the authors point out that any attempt to transfer native lepers to a central leprosorium would only lead to the flight and concealment of the sufferers. Isolation is therefore carried out as far as possible in "Isolation Villages," maintained partly by the tribes concerned and partly by the local Administration. Medical inspection, classification and statistics, search for lepers amongst the native tribes, and general measures of sanitation all receive attention. [If the work of PAUTRIER and MANTOUX on the diagnostic value of intradermal inoculations of leproline is confirmed, this method should be of great use in investigations in these and similar native communities, on lines similar to those used by tropical workers on tuberculosis with tuberculin.]

S. L. C.

MATHIS. **L'Helminthiase, le Goitre, la Lèpre dans la haute Région du Tonkin (Langson-Caobang).**—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.-Feb.-Mar. Vol. 17. No. 1. pp. 197-215.

The people most affected by leprosy in this region are the Thos and the Nongs, of whom the latter are the more subject to the disease. The total number of cases is not large—about 40 in a population of 80,000 (1 to 2,000). It is common for lepers from China to migrate into the district in order to evade the Chinese methods, which are drastic, and to undergo any treatment that may be possible at the Leper Settlement.

The latter is a village so situated as to be no danger to other villages. This segregation in a village where the lepers can cultivate the soil and live a more or less normal existance is a great advance on the methods of isolation of cases in crowded institutions and in close contact with each other. The settlement appears to be popular amongst the natives.

S. L. C.

MOREAU (Laurent). **A propos de la Prophylaxie de la Lèpre. Les Léproseries des îles Comores.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 91-95. With 2 figs.

This short and terrible account of isolation in the leper-settlement of the Comoro Islands makes most painful reading. No single instance of individual suffering is quoted, but the bald statement of the facts is quite enough to awaken even the dullest imagination. At the time of Dr. Moreau's visit to the island of Djimadgini, the leprosorium for Mohéli, the population consisted of ten persons, five males and five females, an eleventh individual having just died. Their entire maintenance consisted of two packages (*balles*) of rice and some drinking water sent monthly from Mohéli. The one well on the island had recently dried up. Since there is no doctor even in Mohéli itself, these people are without any medical assistance. The conditions in the other islands are only slightly better than at Djimadgini. The author advises that native doctors from the medical school at Tananarive should be employed on leprosy work in these islands.

[The placing of a few advanced cases of leprosy on uninhabited islands, far from supervision and medical attendance, cannot be of much value in prophylaxis and involves unimaginable suffering to individuals. If isolation is necessary, it could surely be carried out in leper villages on the larger islands.] S. L. C.

PEIPER (Otto). **Die Bekämpfung der Lepra in Deutsch-Ostafrika.*** [Anti-Leprosy Measures in German East Africa.]—*Lepra.* 1914. Feb. Vol. 14. No. 4. pp. 192-250. With 2 plates, 34 text figs., and 1 map.

The first 46 pages of this valuable Report deal with the history of the efforts to provide for the needs of lepers in German East Africa, and with the distribution of disease in the various Administrative Districts of the Protectorate. This portion of the work, while of high value to Administrators, does not lend itself to the uses of a summary and must be studied in the original. Under the heading of "treatment" the author briefly relates the effects of various therapeutic measures, summing up in favour of Nastin, which appears to have given excellent results where persisted in for a sufficient length of time. Although LENZ was unable to report any appreciable benefit with Nastin and Chaulmoogra oil at Bagamoyo (1905 and 1909), NEUBERT, working at New Langenberg, obtained encouraging results in a series of five cases and Peiper, at Kilwa, satisfied himself of the value of the remedy. In five cases, previously treated with large doses of sodium salicylate internally and daily rubbing with green soap, without any effect, subcutaneous and intramuscular injections of Nastin were tried, first as a two months' course lasting until October 14, then, after a pause, as recommended by DEYCKE, a further course lasting from the middle of November 1909 to January 1910, Nastin B1 and Nastin B2 being used. Three of the patients were given a further course from the end of January to the beginning of March 1910. Of these three, two appear to have been practically cured, so far as could be ascertained by inspection at intervals of several months after cessation of treatment. The third was not cured. All the patients seem to have improved. Expense forbids a wider trial of this preparation. The principles which should guide the organisation of further leper colonies in the Protectorate are discussed at some length, the author showing a thorough comprehension of the African negro and a practical sympathy with the leper whose disease condemns him to isolation in the interests of the community. His conclusions are as follows:—

"1. At present and in the near future, any attempt to root out leprosy by curative measures must fail owing to the protracted and costly nature of the treatment and the small staff of doctors available.

2. The only possible and practical form that an antileprosy campaign can take in German East Africa is the isolation of lepers, or in other words, their settlement in leper colonies.

3. In the isolation of lepers, a system of decentralisation (e.g. the provision of a large number of small leper colonies) is preferable to any attempt at centralisation (e.g. the institution of one large leper colony for a district)."

*An abridged form of the paper published as Beiheft 4 of the *Archiv f. Schiffs- u. Trop. Hyg.* 1913. May. Vol. 17.

The report is accompanied by some excellent photographs and plans showing the arrangement of the buildings in certain leper colonies throughout the Protectorate.

S. L. C.

ZAMBACO PACHA (Démétrius Al.). **La Lèpre à travers les Siècles et les Contrées.**—xii + 845 pp. Paris: Masson & Cie. [12 frs.]

This work is reviewed on page 508.

CLINICAL.

WILLIAMS (A. Winkelried). **Case of Nodular Leprosy.**—*Proc. Roy. Soc. Med.* 1914. Apr. Vol. 7. No. 6 (Dermatological Section). p. 170.

This is a report on a case of leprosy in an ex-soldier born in India, who later served in that country and in South Africa. The disease appears to have remained undiagnosed during the patient's army service, a blow on the knee received at football, which resulted in a chronic ulcer, being regarded as the principal lesion. He now presents the typical facies, and clumps of lepra bacilli are to be found in the nasal discharge. Anaesthesia more or less marked can be elicited in the upper and lower limbs.

S. L. C.

PAUTRIER (L. M.). **Le Diagnostic de la Lèpre par les Méthodes de Laboratoire.**—*Presse Méd.* 1914. Mar. 14. No. 21. pp. 203–204.

After pointing out that the diagnosis of leprosy is becoming of increasing importance in view of the rather large number of lepers returning to France from the colonies or resident in the country, Dr. Pautrier summarises the steps to be taken under three headings, Biopsy, Bacteriological examination of the nasal mucous membrane, and the intradermal injection of Leproline. A clear description of the technique for removing a portion of infected tissue and for staining and examining it is given under the first heading. In the examination of the nasal mucous membrane, where the usual nasal catarrh is absent, the author recommends the administration of potassium iodide in doses sufficient to cause a nasal discharge, in which the bacilli may often be demonstrated. The presence of an acid-fast bacillus, that of KARLINSKI, in the nasal mucous membrane is not uncommon in non-leprous persons and may give rise to errors. It is distinguished by its growing easily in ordinary media and being pathogenic to guinea-pigs. The intradermal injection of 1/20 c.c. of ROST'S leproline (previously autoclaved for 20 minutes at 120°C.) has been found by the author and MANTOUX to lead to a characteristic reaction in lepers, a little nodule forming at the site of injection, increasing from the third day onwards to the size of a sixpence and having a little dark point or scab in the centre. The scab detaches itself on about the fifteenth day. In normal persons, nothing beyond a transitory erythema follows the injection.

S. L. C.

DAVIES (T. S.). **Further Notes on the Specific Treatment of Leprosy by a Cultural Extract.**—*S. African Med. Rec.* 1914. Mar. 14. Vol. 12. No. 5. pp. 77–78.

A cultural extract prepared by Dr. BAYON and injected at intervals of about five days has, in the hands of the author, given promising results which he summarises as follows :—

"By treating seven lepers with a cultural extract, a remarkable improvement was brought about in two, marked improvement became noticeable in three, and slight improvement took place in the remaining two." . . . . "All cases belonged to the macular and maculo-anaesthetic type. One had incipient nodules."

S. L. C.

HONEIJ (James A.) i. **Leprosy. Some Notes on Symptoms.**—*Boston Med. & Surg. Jl.* 1914. Jan. 15. Vol. 170. No. 3. pp. 85–87. ii. **Leprosy. The Pulse as a possible Indicator of the Progress of the Disease. (A Preliminary Note.)**—*Ibid.* Feb. 12. No. 7. pp. 233–235. With 8 charts.

i. The author considers that, while the bacteriology and pathology of leprosy have been thoroughly studied, "the many clinical aspects presented have not been emphasized." The paper is designed to call attention to the amount of information to be derived from a close clinical study of cases. It is worth noting that, in fifteen cases, all except one (an anaesthetic case) showed lesions of the nasal mucous membrane on careful examination.

ii. In contrast to the usual evening rise of pulse rate, temperature and respiration, Dr. Honeij calls attention to a morning rise, of the pulse rate at least, in certain cases of leprosy. It would seem that this curious phenomenon occurs "in the majority of cases, and especially in those patients who are in an advanced active stage of the disease. The condition is present during febrile disturbances." In one case at least, the symptoms disappeared as the patient's condition improved. The author suggests that this morning acceleration of the pulse may prove to be a useful prognostic sign. [This new and interesting observation is the first-fruits of the careful clinical study of leprosy which is being carried out by the author at the Penikese Island Hospital, and further notes on the subject will be awaited with interest.]

S. L. C.

TERRA (F.). **Um Caso de Lepra de Forma Achromica.**—*Boletim da Sociedade Brasiliera de Dermatologia.* 1913. Anno 2. No. 1. p. 19 and p. 35.

In a negress aged 13 years, the daughter of a leprous father, who himself had suffered from leprosy for the last five years, a white patch appeared on the right malar region followed by others on the arms, buttocks, ears, and left leg. The patches, which closely resembled vitiligo (leucoderma), were distinguished from the latter by their marked asymmetry and by the fact that, although sensibility to touch was preserved, sensibility to sensations of pain and heat was diminished. The diagnosis was confirmed by bacteriological findings from the nasal

mucous membrane. The case is of interest, as leprosy and leucoderma are often confused, especially by the lay population in tropical countries.

S. L. C.

COLOMBIER (P.). **Lésions osseuses précoces dans la Lèpre constatées par la Radiographie.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 2–3. With 1 plate.

By means of radiography Dr. Colombier has been able to note bone lesions at a time when, as yet, clinical evidence afforded no indication of their presence.

The plate published with the paper shows very clearly a narrowing and pointing of several of the terminal phalanges in both feet. In another case, a similar change was demonstrated in the left foot and in the nasal bones. Similar observations by T. MILLER (see this *Bulletin*, Vol. 2, p. 286) are quoted as the only previous notice of the application of radiography to the study of leprosy.

S. L. C.

BACTERIOLOGY.

THOMSON (David). **Attempts to find Disease Germs in the European Bed Bug (*Cimex lectularius*) after Feeding Experiments in various Diseases: Leprosy, Lymphadenoma, Carcinoma, etc.**—*Ann. Trop. Med. & Parasit.* 1914. Apr. 21. Vol. 8. No. 1. pp. 19-28.

In the course of a research on some of the obscure diseases of temperate climates, carried out with special reference to possible phases of the causative agents in the bodies of blood-sucking insects, D. Thomson fed bed-bugs (both *Cimex lectularius* and *C. rotundatus*) on a series of lepers. The bed-bugs were killed and examined for acid-fast bacilli at periods varying from one to fifteen days after the feeding. No acid-fast bacilli were found in 105 bed-bugs fed on lepers, nor in 35 caught on the bed mattresses of leper patients.

S. L. C.

ROST (E. R.). **On the Leprosy Bacillus and Allied Bacilli.**—*Trans. xvii Intern. Congress of Med.* London, 1913. Sect. iv. Bacteriology & Immunity. Pt. 2. pp. 111-118.

Major Rost believes that the remarkably beneficial effects observed by him on using "leprolin" in a series of cases prove that his streptothrix, from which the leprolin is prepared, is the cause of leprosy. To obtain cultures, he uses a medium prepared from Lemco broth, milk and the distillate from the condensation of steam passed over fish. "This medium is inoculated with the blister fluid of lepers, preferably spontaneous blisters, or the juice expressed from nodules which do not bleed." The vaccine (leprolin) is made from six-week broth cultures of mixed streptothrix, that is to say from a mixture of several different strains isolated from lepers, the culture being filtered through blotting-paper after agitation and the filtrate sterilised.

Intramuscular injections are given once a week, 1·5 to 3 c.c. for anaesthetic cases, 1 c.c. for nodular ones. "Fish and milk should be excluded from the diet, and fairly large doses of sodium chloride taken daily. Salt water baths and the application of erythema-causing ointments to the nodular patches just after the injections of vaccine, in order to cause a better blood-supply, are advantageous. An ointment composed of sodium chloride and vaseline should also be rubbed into the affected areas." The results of treatment in 22 cases are analysed. Of these, seven were "cured, apparently cured, or almost cured" and seven greatly improved. Major Rost calls especial attention to the danger of infected clothing, and warns residents in endemic areas against the possibility of infection of garments when washed by natives. He claims to have cultivated the germ of leprosy from the clothing of lepers.

[It is rash to assume that the efficiency of an organism in vaccine therapy necessarily proves that organism to be the cause of leprosy. It might be claimed, on the same ground, that other cultures, differing from that of Rost, were equally the cause of the disease. Again, there must inevitably be some doubt as to the significance of cultures obtained from blister-fluid, from material expressed from nodules, and even from the clothing of lepers, in view of the negative results obtained by FRASER and FLETCHER from material obtained with elaborate precautions from the interior of non-ulcerating nodules.]

S. L. C.

DUVAL (Charles). **Pertinent Remarks upon the Cultivation of the Leprosy Bacillus.**—*Trans. xvii Intern. Congress of Med.* London, 1913. Sect. iv. Bacteriology & Immunity. Pt. 2. pp. 103-109.

Having in view the diversity of opinion as to the culture of HANSEN'S bacillus, Duval has carefully investigated a series of uncontaminated nodules to obtain material for comparison with other organisms regarded as leprosy bacilli. His results indicate "(1) That many of the cultures grown from leprous lesions and regarded as the cause of the disease are varieties of one or more species and probably have no etiological relation with leprosy. (2) That the specific organism of Hansen, *in vitro*, is an acid-fast rod (schizomycete) analogous to the tubercle organism, and its initial cultivation outside the host is accomplished with a medium containing the dissociate products of animal protein." The multiplication of Hansen's bacillus in the portions of tissue used for culture, the value of the amino-acids in favouring a growth, and the presence of the germ inside cells which, apart from mechanical distension, appear but little affected by its presence, all suggest that the organism assimilates, within the cell, the end-products of tryptic digestion, being unable of itself to attack and break down the whole protein molecule. "Failure to recognise that the leprosy organism is unable to attack the whole protein, and that it requires the amino-acids for assimilation, explains why mixed cultures which at first contained the Hansen's rods subsequently resulted in a pure growth of the associated species." Of the two strains isolated by Duval, one, a free-growing chromogenic bacillus and the other, a non-chromogenic organism growing slowly and only upon a split protein medium, the latter would appear to be a separate species,

and, according to the author, is the true leprosy bacillus. The most convenient method of culture is to transfer bits of the leprous nodule to slanted 1 per cent. alkaline agar and seed with a proteolytic non-spore-bearing bacterium which is designed to digest the protein and enable the lepra bacillus to multiply. The hydrolysing organism is later got rid of by heating to 60° C. for half-an-hour, which does not kill the bacillus of Hansen. "The specific organism of human leprosy is undoubtedly a schizomycete, genus bacillus, and not a trichomycete, genus streptothrix, any more so than the tubercle bacillus."

[The above quoted paper is not consistent with the report of the proceedings of the xvii International Congress of Medicine published in the *British Medical Journal* of August 23, 1913, p. 468 (see also this *Bulletin*, Vol. 2, p. 534). A final statement of Dr. Duval's views will be awaited with interest.]

S. L. C.

Wolbach (S. B.) & Honeij (James A.). **The Diphtheroid Bacillus from Leprosy Lesions.**—*Jl. of Med. Research.* 1914. Mar. Vol. 30. No. 1. (New Ser. Vol. 25). Whole No. 143. pp. 1–8. With 2 plates.

In describing a diphtheroid bacillus isolated from a leprous lesion, the authors point out that "the data for the absolute identification of diphtheroids are not sufficient" and accordingly give a very full account of their culture in the hope of establishing a better standard for the future descriptions of such organisms. The material was an epitrochlear lymph node obtained with elaborate aseptic precautions from a case of the tubercular type of leprosy known to have suffered from the disease during 16 years. The following media were inoculated :— Ascitic fluid dextrose agar, ascitic fluid agar, ascitic fluid glycerin agar, Ficker's brain agar, Dorsett's egg medium, glycerin agar and placental agar. Two sets of tubes, one for incubation aerobically, and one for anaerobic culture, were put up in each case. The material was proved by staining to be rich in lepra bacilli. Two guinea-pigs inoculated with the tissue were apparently quite free from disease nine months later. After ten days culture, growth was seen in a single aerobic tube of ascitic fluid dextrose agar in the form of a translucent whitish band around the piece of gland tissue. After several months of culture the bacillus grew readily on broth with or without glycerine, plain agar, dextrose agar and glycerine agar. The bacillus is extremely pleomorphic a typical diphtheroid in its general characteristics, and remarkable from the fact that all cultures show the presence of acid-resistant granules and segments. There are also non-acid-fast coccoid forms as well as slender paired bacilli closely resembling the diphtheria bacillus. Involution forms appear after a few days' culture. The bacilli are strongly Gram-positive, stain, though not with great facility, with the ordinary aniline dyes, and,as stated above, resist acids in certain cases, the acid solutions used being dilute and not applied for very long (as 3 per cent. sulphuric acid in 95 per cent. alcohol for 30 seconds). The colonies on agar media appear in 48 hours, being at first clear and afterwards rather dry and growing by the production of fresh colonies at the edge. In dextrose, maltose and glycerine, acid in considerable quantity is produced. The organism

showed no pathogenicity for Japanese waltzing mice, guinea-pigs, rabbits and white rats. For a full description, the original article should be consulted.

[As pointed out by the authors, the frequency with which diphtheroid organisms comparable to that above described have been isolated from cases of leprosy makes it of great importance that workers should invariably study and record all such finds. It is to be hoped that the careful description now under review will serve as a model to all who publish accounts of such organisms.]

S. L. C.

WOOLLEY (Paul G.). **Cultivation of the Bacillus of Leprosy: A Review.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1914. Feb. Vol. 1. No. 8. pp. 580–583.

This is a brief review of the various attempts to cultivate the leprosy bacillus, the author concluding that "each investigator believes he has cultivated the cause of leprosy, and . . . . none of them have proved it, and further that a deal of work remains to be done." No new light is thrown upon the subject, but the review will commend itself to those in need of a concise account of recent work in the direction of attempts to cultivate the leprosy bacillus, more especially as it gives references to all papers of first-rate importance on the subject.

S. L. C.

FEDERATED MALAY STATES. **Twelfth Annual Report of the Institute for Medical Research, Kuala Lumpur, Federated Malay States, 1912.** [FRASER (H.) M.D., Director.] 1913. Kuala Lumpur: Printed at F.M.S. Government Printing Office. [Leprosy pp. 16–26.]

The greater part of the work on Leprosy dealt with in this report has already been reviewed (see this *Bulletin*, Vol. 2, 1913, pp. 502 and 503) and it is therefore unnecessary to do more than quote a sentence which sums up the negative result of many careful attempts to cultivate HANSEN'S bacillus on the various media claimed as successful for this purpose. "Twenty-four patients have been dealt with and 246 inoculations made on various culture media. In no single instance has a culture of the leprosy bacillus been obtained."

S. L. C.

FEDERATED MALAY STATES. **Report from the Institute for Medical Research, Kuala Lumpur, for the Period 1st April to 30th September, 1913.** [FRASER (H.), Director.]—Report to the Advisory Committee for the Tropical Diseases Research Fund. Received in Colonial Office Jan. 24, 1914. [(Proof) Leprosy pp. 5–14.]

In continuation of their previous work on this subject (see this *Bulletin*, Vol. 2, pp. 502–503), FRASER and FLETCHER have carried out further experiments with a view to ascertaining whether the *Bacillus leprae* can or cannot be cultivated. In the new series, an important advance in technique has made it possible to dispense with the use of iodine as a disinfectant, the leprous tissue being now removed

after the raising of a skin flap, without the application of any antiseptic. In a large series of attempts at culture on serum-agar, serum mixed with sterile agar, and English proof-agar, only negative results were obtained. The most important addition to the previous report is a comprehensive investigation of the results to be obtained on Clegg's medium, the leprous material being added after the establishment of cultures of amoebae (from a water-tank) and cholera vibrios. Tissue rich in bacilli was obtained from each of two cases (Nos. 37 and 38), five tubes being, in each case, inoculated with (a) nodular material and (b) an emulsion of the leprous tissue, thus making a total of 20 tubes. In one tube inoculated with emulsion from Case 37 a portion of nodular material was included. In subcultures, the nodules were removed to fresh tubes along with a loopful of the amoebae-cholera culture but, where emulsions had been used, subculture was effected by the transfer of a loopful of the mixture only. It is therefore evident that, in the case of the nodule-cultures, all the leprous tissue was carried over to the fresh tubes, while in the case of the emulsions, a considerable dilution of leprous material was effected at each transfer. The results are shown in the following table.

		2nd Sub-culture.	3rd Sub-culture.	4th Sub-culture.	5th Sub-culture.	6th Sub-culture.	
Case No. 37 Nodules of leper tissue.	1	+	+	+	+	+ +	
	2	+	+	+	+	+ +	
	3	+	+	+	+	+	
	4	+	+	+	+	+	
	5	+	+	+	+	+	
Case No. 37 Emulsion of leper tissue.	1	—	—	—	—	—	
	2	+ +	+	+	+	+	On these tubes (2) there was a nodule of leper tissue.
	3	—	—	—	—	—	
	4	—	—	—	—	—	
	5	—	—	—	—	—	
Case No. 38 Nodules of leper tissue.	1	+	+	+	+	+	
	1	+	+	+	+	+	
	2	+	+	+	+	+	
	3	+	+	+	+	+	
	4	+	+	+	+	+	
	5	+	+	+	+	+	
Case No. 38 Emulsion of leper tissue.	1	—	—	—	—	—	
	2	+	—	—	—	—	
	3	—	—	—	—	—	
	4	—	—	—	—	—	
	5	—	—	—	—	—	

It will be seen at a glance that, in the nodule-culture tubes, where there had been a carrying over of the infected tissue, acid-fast bacilli could still be found in all the subcultures, whereas in the tubes containing emulsion, and therefore subject to increasing dilution of the lepra bacilli present, in no case were acid-fast rods found after the second subculture except in the solitary instance where a portion of nodular substance had been introduced with the emulsion and carried

on in the successive tubes. After the sixth subculture, the tubes in which lepra bacilli had persisted were subjected to heat for half an hour at 60°C., as in CLEGG's original method, and further subcultures then made. No growth of acid-fast bacilli could be demonstrated in these preparations.

The above experiment shows clearly that there was persistence but not proliferation of the bacilli. On the assumption that, as lepra bacilli multiply in living tissue, it might be possible to obtain a culture in leprous tissue grown *in vitro* by CARREL's method, an interesting experiment was carried out with material obtained from a case of nodular leprosy (Case 39), but without any success as regards the cultivation of lepra bacilli up to the time of writing. The report of this experiment (which is still in progress) does not make it clear whether the authors were satisfied that a growth of tissue had actually taken place. As this point is vital in any attempt to draw conclusions, judgment must be suspended until further information is forthcoming. The report concludes with a series of 39 experiments on animals in which, up to the date of writing, no success had attended efforts to obtain a growth of lepra bacilli in the tissues of rabbits, guinea-pigs, rats and a gibbon, after the introduction of leprous material. In view of the divergence of their results from those of other workers, the authors suggest that steps might be taken by the Tropical Diseases Research Committee to organise an international commission composed of the various investigators who have worked at the disease.

S. L. C.

BAYON (H.). **The Micro-Organism of Leprosy: Has it been cultivated?** —*Lepra*. 1914. Feb. Vol. 14. No. 4. pp. 187-191. With 4 coloured plates.

In this paper, Bayon deals critically with the opinions expressed by FRASER and FLETCHER (See this *Bulletin*, Vol. 2, pp. 502–503) as to the significance of the Kedrowsky diphtheroid in the causation of leprosy. To the assertion that it is misleading to "describe germs as acid-resisting because they retain the carbol-fuchsine after momentary immersion in weak acid," Bayon replies that the power to resist the action of acids is relative and that certain bacteria of a diphtheroid type resist decolourisation by 1 per cent. of sulphuric acid, while most cocci and bacilli do not. In view of this fact, it cannot be called misleading to cite this character in their recognition.

He fully admits the difficulty of cultivating Hansen's "bacillus" or of infecting laboratory animals with it; (for instance, he himself obtained only two infected animals out of three series of from 20 to 25 mice and rats injected with leprous cultures); and finds, in the work of FLETCHER and FRASER, confirmation of his own view that the acid-fast stage of Hansen's "bacillus" is difficult or impossible to isolate in culture. He thinks that the authors should have paid greater attention to the diphtheroids isolated by them in their attempts at culture from leprous tissue, and claims that it is still open to question whether these latter organisms were contaminations, as assumed, or acid-labile stages of Hansen's "bacillus." Bayon claims that the

lesions following the injection of the Kedrowsky organism in rats are comparable with the lesions in human leprosy. A series of very beautiful coloured plates serves to illustrate the points raised in the paper.

S. L. C.

FRASER (H.) & FLETCHER (W.). **The Dependence of Leprosy on Fish-eating.** [Correspondence.]—*Lancet.* 1914. Feb. 21. p. 573.

Attention is called to the fact that, in his experiments on cold-blooded animals, quoted in the *Lancet* of December 13, 1913, COURET* employed DUVAL's cultures. Since these cultures have now been acknowledged by DUVAL himself to be other than the lepra bacillus, COURET's experiments, with the exception of two carried out on gold fish with leprous tissue, lose their value as bearing on the question of leprosy. In the two exceptions mentioned the possibility of fallacies is so great that no value can be attached to them.

S. L. C.

MARCHOUX (E.). **La Lèpre des Rats.**—*Presse Méd.* 1914. Mar. 14. No. 21. pp. 201-203.

Regarding efforts to cultivate Hansen's bacillus and attempts to transfer it by inoculation as hitherto unsuccessful, M. Marchoux has applied himself to the study of the bacillus of STEPHANSKY, in hopes that the investigation of this allied germ may throw light upon the many unsolved problems of human leprosy. Rat-leprosy manifests itself in two forms, a glandular and a musculo-cutaneous, presenting histological features strictly comparable to those of man. An important point of distinction is the facility with which rat-leprosy is transmitted by inoculation, even when very small amounts of germ-containing tissue are introduced under the skin. Mice and guinea-pigs, the latter only exceptionally, are capable of being infected. Rabbits, monkeys and other animals are refractory. Although the bacilli multiply in fragments of tissue placed on nutrient substrata, the multiplication is confined to the tissue and stops short of the culture medium. Attempts to transmit the disease by fleas and lice have given negative results, nor can these insects be shown to contain the bacilli after feeding on infected animals. Acid-fast bacilli closely resembling those of rat-leprosy are to be found in *Laelaps echidninus*, but can be separated from the leprosy bacillus by inoculation experiments. *Sarcoptes* and *Demodex* may both play a role in producing skin-lesions through which the bacilli may penetrate, while house-flies are a real source of danger, since Marchoux was able to infect clean rats by allowing flies to pitch on raw surfaces after having fed on infected sores. The most usual mode of transmission amongst rats would seem to be by biting, an interesting case of this being recorded. The average infection tends to be mild and to go on to recovery. To obtain severe attacks, it is necessary to inoculate pyogenic germs, preferably staphylococci, at the same time as those of rat-leprosy. As many of the points

*COURET (Maurice). The Behaviour of *Bacillus leprae* in Cold-blooded Animals.—*Jl. Experimental Med.* 1911. Vol. 13. pp. 576-589.

demonstrated have a definite bearing on the human disease, the author's conclusions must be quoted in full.

1. The specific bacillus is not a resistant germ.
2. It is easily inoculated into susceptible animals.
3. Biting insects do not transmit the disease.
4. *Sarcoptes*, *Demodex*, and flies play an ancillary role in transmission.
5. Germs are easily introduced through the skin on contact with infected individuals.
6. The intact preputial mucous membrane will allow the germ to pass through.
7. Clinically recognisable rat-leprosy is rare in comparison to the mild and latent type.
8. Atypical infections may remain undiagnosed till death.
9. The disease may recover spontaneously.
10. It becomes recognisable as rat-leprosy where secondary infections coexist.
11. The hygienic measures applicable against tubercle will serve against leprosy also.
12. Prevention must be directed to the exclusion from the skin of all chance of contamination by specific bacilli.

S. L. C.

Book Reviews.

ROGERS (LEONARD). **Dysenteries. Their Differentiation and Treatment.**—xi + 336 pp. With 10 plates, 2 charts and 3 diagrams. 1913. London: Henry Frowde & Hodder & Stoughton. [Price 10/6 net.]

When an author, possessing unrivalled opportunities for the study of the various forms of such a disease as dysentery, publishes a book with the title of "Dysenteries," the reader naturally hopes that he will find a complete account of this subject. Let us examine this work and ascertain if the reader's hopes are realised.

After touching on the history of the knowledge of the various forms of dysentery, especially the differentiation of the amoebic from the bacillary form of the disease, the author discusses "the epidemiology of dysenteries," in such a way as to force the reader to conclude that the author has no views outside of India and that in reality this chapter consists of an account of the seasonal incidence of dysentery in India.

The next chapter concerns the entamoebae, their life history and their differentiation and, considering that the author is a professor of pathology, the reader looks confidently for a good account of this difficult subject; but he looks in vain, and to heighten his disappointment is a plate showing drawings of stained and unstained *E. histolytica*, which in execution might well be compared to the daubs of the nursery.

Chapter IV is a welcome change, as here the reader has a very good and clear account of the pathological anatomy of amoebic dysentery, especially the naked-eye lesions, and further it is adorned with three beautiful coloured plates showing the macroscopic lesions found in the different stages of the disease.

Chapter V deals with the clinical aspects of amoebic dysentery and of this the author gives a clear and concise account.

Chapter VI concerns the treatment of dysenteric symptoms caused by amoebae. Ipecacuanha and emetine salts are alone discussed. Bismuth subnitrate in large doses is not even mentioned and, as in the author's early papers on this subject, VEDDER'S work receives but scanty recognition; it would be well if it were more generally realised that to follow the dictum "Render unto Caesar the things that are Caesar's" is, in all branches of science, not only a graceful but a necessary act.

The next 108 pages deal with the "remote complications of amoebic dysentery," and are almost entirely concerned with liver abscess; of this condition the author gives a good description, especially of the symptoms, signs and treatment.

Chapters VIII, IX, X, and XI are on bacillary dysentery. Dealing first with the bacteria causing dysentery, the author gives a very poor, confusing and often misleading account of these organisms and the methods of their differentiation.

For instance, in the account of the fermentation of the various sugars by the different strains of the dysentery bacilli some organisms are stated to produce acid in *glucose* but not in *dextrose*! and a table of sugar reactions is given, which differs from any that have hitherto been published.

The methods of differentiation of these bacilli by agglutination with immune sera and complement fixation are given in a few short paragraphs, as if in the carrying out of these tests there were few difficulties or errors into which an unwary worker might stumble.

As in amoebic dysentery, so in bacillary dysentery the author gives the reader a very good account of the pathological anatomy, and again illustrates his remarks with a beautifully executed coloured plate. The symptoms and treatment are adequately dealt with.

The next chapter, which deals with forms of dysentery other than amoebic and bacillary, is of a very incomplete and sketchy character.

Finally, the author devotes a chapter to hill diarrhoea and sprue, and gives the ordinary text book account of these diseases with a few unimportant statistical tables that were forced upon him during the observation of some fifty cases.

From the above criticisms it is clear that the reader's hopes for a complete account of the various forms of dysentery have not been fulfilled, but he has instead been regaled largely with remarks, varying in merit, on amoebic and bacillary dysentery, the result of the author's experience and work in India.

Lastly, a word concerning the author's style. One might almost think that he had reached the Nirvana of the Buddhist, but surely by a different route, which state is described in the words of the poet, "Foregoing self, the universe grows 'I'!"

S. R. Douglas.

ZAMBACO PACHA (Démétrius Al.). [de Bysance.] **La Lèpre à traverse les Siècles et les Contrées.**—xii + 845 pp. 8vo. 1914. Paris: Masson & Cie. [Price 12 fr.].

This volume is the last of many contributions made by its distinguished author to the literature of leprosy and it marks the last chapter of a life devoted to the study of the disease. It is impossible to read it without a tribute to the energy and courage that could carry through such a work at the end of a long life. A large part of the book is devoted to a historical consideration of leprosy in different countries, and forms an important contribution to medical archaeology as well as to the study of leprosy. This historical survey leads up to the promulgation of the author's well-known views on the hereditary nature of the disease, and an attack upon the theory of "contact" as a factor in its dissemination. It is far easier to assail the theory of contact than to uphold that of heredity and, in the latter endeavour, the author requires all his eloquence and conviction to maintain the argument. In order to explain away the celebrated observations of HANSEN on the freedom from leprosy of the descendants of Norwegian emigrants settled in America, he is obliged to assume a type of heredity that only reveals itself under circumstances unfavourable to the individual. "C'est là l'hérédité en énergétique qui ne fera explosion dans la descendance que dans le cas où les conditions extérieures la favoriseront." But the external conditions quoted as favouring the outbreak of a hereditary taint are just those likely to bring about "contact" infection. Diseases that are indisputably hereditary, such as haemophilia, do not require poverty and overcrowding to evoke them in the persons affected. Heredity may be held responsible for the transmission of diseases depending on a somatic defect, but in leprosy we have to do with a parasitic infection, a very different thing. Even supposing that a child may sometimes be born infected with leprosy, this does not settle the question of the hereditary transmission of acquired characters. To quote from HANSEN and LOOFT, ("Leprosy" 1895) "were BAUMGARTEN'S hypothesis correct, it should certainly be called a hypothesis of latent infection and not a hypothesis of heredity." In attacking the theory of contact infection, Zambaco Pacha directs most of his energy against a position that is no longer occupied by the enemy. It is no longer seriously maintained that occasional or transitory contact with lepers is dangerous. If "contact" is responsible, it must be close, intimate and prolonged. Many of the arguments employed against "contact" are two-edged, as the following:—"Colonists and soldiers returning to France infected with leprosy after long residence in endemic localities live with their families without any precautions and yet infect no one." But how did these colonists and soldiers get infected? Are we to believe that the disease had been latent in their stock from the Middle Ages and only developed on their proceeding to the Colonies, or is it not more probable that the long residence in an endemic locality led to their infection? But while opinions must necessarily differ on such intricate questions as the mode of propagation of a disease so little understood as leprosy, there can be no two opinions as to the high value of this last work of Zambaco Pacha on the subject which he made so completely his own, and to which he devoted his life.

S. L. Cummins.

RHO (FILIPPO). **Die tropischen Intoxikationskrankheiten. 1. Vergiftungen durch pflanzliche Giften.** [Tropical Toxic Diseases. 1. Vegetable Poisons.]—MENSE-*Handbuch der Tropenkrankheiten*. 2nd Edit. Vol. 2. pp 517–616. 1914. Leipzig: Verlag von J. A. Barth.

This monograph forms part of an extensive *Handbuch der Tropenkrankheiten* edited by Dr. Carl MENSE, who has translated Dr. Rho's work into German. As the sub-title tells us, Dr. Rho deals only with vegetables poisons, but the term is somewhat elastic since the book contains sections describing Pellagra, Kava, Tea and Cassava. The general introduction begins with a definition of a poison and draws attention to the great number of such substances to be found in the vegetable kingdom. Follow certain historical references, such as include SOCRATES and his compulsory draught of hemlock; and the toxicological experiments of MITHRIDATES. Dr. Rho suggests, as is indeed most likely, that the early knowledge of poisonous plants was acquired through fatal accidents. Dr. Rho briefly reviews the various uses to which mankind has put this knowledge, mentions symptoms and states produced by their action and refers to habit, toleration and idiosyncrasy. Idiosyncrasy may be racial, or individual. Animals differ from one another and from man in their reaction to poisons and even colour makes a difference, as in the well-known case, quoted by DARWIN, of the resistance offered by black pigs to the effects of "paint-root" (*Lachnanthes*).

The rest of the work is divided into sections classifying plant poisons according to their use and employment by man :—

i. Arrow poisons. Seventeen families and thirty-seven species of plants from which such poison may be obtained are given. The most powerful and best known of these are derived from various species of *Strychnos*, *Aconitum ferox*, *Strophanthus hispidus* and *Antiaris toxicaria* (Upas tree). The well-known Curare is made from *S. toxifera* and other species of *Strychnos*. The Aconite root is said to be used by the hill tribes of the Himalayas. This may be so occasionally when setting bow-traps for wild animals, but not otherwise. The Akas of Assam, who are not mentioned, use aconite poisoned arrows for the chase and when head hunting. Only the most important of these poisons are fully described, with illustrations of the plants from which they are derived. Dr. Rho points out that snake poison is often mixed with the vegetable matter. Of the illustrations, which are reproduced drawings, all are clear and satisfactory. Fig. 4, *Strophanthus, hispidus*, is very good.

ii. Poisons used in ceremonial or judicial ordeal (*Gottesurteil*). A well-known custom all over Europe during the middle ages, trial by ordeal, is now only practised among certain tribes in Africa and in Madagascar. The best known of these poisons, used to prove guilt or innocence in cases of crime or witchcraft, is the Calabar bean (*Physostigma venenosum*). An emulsion is made and swallowed. The innocent vomit and are safe, the guilty retain the poison and die!

iii. The third section treats of poisons used for catching fish. A very long list of these is given. The active principle in many of these plants is Saponin or a similar glucoside.

iv. Plant poisons used for homicide or suicide. Of these there is nothing new to be noted. Considerable space is devoted to Dhatura and Dr. Rho states that an attempt was made to poison the French garrison of Hanoi with this drug on June 28th, 1908. Severe symptoms of poisoning occurred but no death. Dhatura was a favourite poison with the Thugs of India and is much used in the East, as one or other of the several species grows wild, and the poison is easily obtained.

Sections v, vi and vii deal with plant poisons used for killing animals, large and small; with poisonous plants dangerous to domestic animals; and with plants which occasionally, generally by accident, poison mankind. *Abrus precatorius* is described in Section vii but not in Section v, so it is evident that Professor Rho is not aware of the use of Abrin, either alone or with Arsenic, by the 'Chamars' of India as a 'sui' for poisoning cattle.

Section viii includes plants which have an irritating action on the skin or mucous membranes. Of these no less than seven belong to the family *Anacardiaceae*. *Rhus vernicifera* produces the lacquer workers' disease in China and Japan, and its representative in temperate climates, *Rh. toxicodendron*, "American poison ivy," causes, in many persons, great irritation of the skin with lachrymation and slight rise of temperature. This plant is frequently sold, it is said, as *Ampelopsis Hoggi*! *Primula obconica*, which only affects certain persons, is not included in Dr. Rho's list.

ix. This is a very comprehensive section treating of poisonous plants employed for domestic purposes, for curative purposes, and as popular abortifacients. It includes, also, a short list of plants used to expel intestinal worms.

Passing over plants that have little interest for medical men, we come to Section xv, which deals with Pellagra, Ergotism etc. The essay on Pellagra is very long and exhaustive, but it contains nothing new and leaves us still ignorant of the cause. The bibliography which follows it is, to quote Dominie Sampson, "prodi-gious"—If Dr. Rho has read all it contains he has the reviewer's deepest sympathy.

Sections xvi and xvii include, among others, essays on Alcohol, Opium, Indian hemp and Cocaine. Cocaine, Indian hemp and Alcohol are potent for evil in the order as arranged. Dr. Rho deals fairly with them and his article on Alcohol is logical and tolerant, his statements being backed up by convincing facts all pointing to one conclusion. If the evil effects of abuse of alcohol, and the same is true of cocaine and ganja, were confined to the body and mind of the individual they would be bad enough. These poisons lead, however, to much crime and insanity and their victims are a danger to society. It would be well if all forms of distilled spirit were strictly confined to the arts and to medicine. We should still have wine and beer to make the "glad heart" when necessary! With Opium it is quite otherwise. The opium eater's troubles, if any, are his own. He does not become vicious or insane. The reviewer was a witness before the Indian Opium Commission and knows that many thousands in India and in the East generally use opium freely. If the Chinese had smoked ganja we should never have heard a word against opium; but they are a wise people. Of Tea, Coffee, Maté, Kola and Kava nothing need be said.

Such is a brief review of the contents of this work. It is interesting, carefully compiled and full of valuable information. Of the very few misprints one should be noticed: The name of the author of "Rambles and Recollections of an Indian Official" is SLEEMAN, not SHUMAN. The bibliographies which follow the sections are reasonably complete and works on Indian medical jurisprudence are included, but the reviewer is surprised not to find any reference to that mine of information—The Pharmacographia Indica.

J. H. Tull Walsh.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN..

Vol. 3.] 1914. [No. 10.

PROTOZOOLOGY.

Noc (F.) & Stévenel (L.). **Flore Intestinale du *Stegomyia fasciata* Adulte.**—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10. pp. 708-710.

The authors, writing from Martinique, give an account of the various protozoa, yeasts and other fungi recorded by previous workers in the intestinal contents of *Stegomyia fasciata*. Noc and Stévenel obtained the following results. Of 30 female Stegomyia that had never fed, nine only had a visible intestinal flora. Two contained a small crithidial flagellate, 3μ to 4μ long and 1·5μ to 2μ broad. Others contained yeasts and bacteria. One contained a spirochaete, having the size and appearance of *S. refringens*. A newly-hatched Stegomyia contained a microspirillum.

On another occasion of 11 Stegomyia, having fed on yellow fever patients, or captured in the sickroom, six showed no organisms on dissection, and though bacteria and fungi were present in the other five, no protozoa occurred.

The authors record the above results as they think [and rightly] that a knowledge of the intestinal contents of adult *Stegomyia fasciata* that have taken no food, or have been artificially fed, should precede the study of Stegomyia that have fed on yellow fever patients.

H. B. Fantham.

Laveran (A.) & Marullaz (M.). **Sur deux Hémamibes et un Toxoplasme du *Liothrix luteus*.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 21-25. With 14 text figs.

The authors have recently found several haematozoa and a trypanosome in the blood of *Liothrix luteus*, popularly known as the Japanese nightingale, but really a native of China and India. The birds were bought in Paris. Three out of seven had two species of haemamoebae, two in addition contained Toxoplasma, and in one a very few trypanosomes were seen.

The two haemamoebae are :—(1) a small form named *Haemamoeba tenuis*, and (2) a large organism, nearly allied to *H. ziemanni* and *H. majoris*, which has been named *H. liothricis*. *H. tenuis* was found free but more often intraglobular. The smallest were $\frac{1}{2}\mu$ to 1μ in

(C36) Wt.P10/46—10.3.4. 2,000. 6.14. B.&F.Ltd. G11/4.

diameter, larger ones 4μ to 5μ long and 1μ broad. Black pigment was present. A karyosome was distinct. Schizogony occurred in the erythrocytes. The host cells were little altered by the parasites. Some melaniferous leucocytes were found in blood smears.

H. liothricis. Sexual forms chiefly were seen; they were spherical or oval, 7μ to 8μ in diameter and were often surrounded entirely or in part by the hypertrophied nucleus of the host cell. They were most abundant in lung smears. Schizogony and schizonts were not seen, but a few young forms were found.

Toxoplasma liothricis was found sometimes free in the plasma, more often enclosed in leucocytes. The organisms were vermicular, had voluminous nuclei and presented great analogy with the toxoplasms of the sparrow and of padda.

The authors discuss briefly the classification of haemogregarines, objecting to the separation of certain of them as Leucocytozoa or Leucocytogregarina, and state that endocellular haematozoa should not be classed according to the cells they parasitise but according to their morphological and evolutionary characters. [They appear to have overlooked the fact that morphology, life cycle and physiological reactions were considered in instituting these groups, not merely the character of the cell. It is tempting to ask why physiological characters may be used in the differentiation of morphologically similar trypanosomes (as has been frequently done), while they may not be taken into consideration in dealing with other blood-inhabiting Protozoa.]

H. B. F.

RINGENBACH (J.). **Quelques Hématozoaires du Congo.**—*Bull. Soc. Path. Exot.* 1914. Apr. Vol. 7. No. 4. pp. 296-299.

This paper contains an account of various observations on an avian trypanosome and microfilaria, and on a Plasmodium of a monkey, made by the author when working on the Mission of Delimitation of the French Cameroons, Equatorial Africa, during 1912 and 1913. The Protozoa only are considered in this review.

(1) The trypanosome, parasitic in a bird, *Bycanistes albotibialis*, is described. It is active in movement, violently displacing the red blood corpuscles. It is relatively large and stumpy, with a large, folded undulating membrane. Its total length is 53μ, the free flagellum being 8μ. Its dimensions differ from those of trypanosomes from other species of Bycanistes, but the author does not consider that it is a different species, as pleomorphism of avian trypanosomes is well known.

(2) A Plasmodium, identified as *P. kochi*, was found in the blood of a monkey, *Cercopithecus cephus*. In the fresh state the parasites showed as spherical bodies, the size of a red blood corpuscle, at the periphery of which spirochaetiform elements were in motion. They behaved similarly to the microgametes of Plasmodium. Stained preparations showed similar structures, and the spherical elements contained brownish pigment and a peripheral nucleus. They are believed to be identical with the microgametocytes of *P. kochi*, well known in African monkeys.

H. B. F.

NAWROTZKY (N. N.). **Hämatoparasitologische Notizen.** [Notes on Blood Parasites.]—*Centralbl. f. Bakt.* 1. Abt., Orig. 1914. Apr. 25. Vol. 73. No. 6. pp. 358-362. With 1 plate.

This paper contains notes on certain protozoal parasites of pike, a haemogregarine of the sturgeon and filariae of the heron and the rook. The fish were obtained from the river Woimiga, in Gawriloff-Possad in the Government of Wladimir, Russia.

Trypanosoma remaki, var. *magna*, was found in the pike. Detailed dimensions of the parasite are given. One specimen was seen in which a second small flagellum was present at the end of the body near the blepharoplast. *Trypanoplasma gurneyorum* also was found in the blood of the pike, both large and small varieties being present. Attention is drawn to the occurrence of a small unstainable longitudinal streak, extending along the body. A possible dividing form was seen. The same pike that harboured trypanosomes and trypanoplasms contained also a new species of haemogregarine, *Haemogregarina esocis*. Endoglobular forms only were seen. The number of parasites in the erythrocyte varied from one to six. The length of the parasites varied from 9·1μ to 11·2μ and their breadth from 6·3μ to 8·4μ.

A haemogregarine from the sturgeon (*Acipenser ruthenus*) is recorded for the first time and designated *Haemogregarina ascipenseris*. [Is there not a misprint in the species name? Apparently *acipenseris* was intended by the author.] The parasites were mostly about 7·6μ long and 1·9μ broad. Usually one haemogregarine only occurred in an erythrocyte and free forms were very rarely seen. Two possible division forms were observed. For comparison with the parasite a table of dimensions of the erythrocytes of the sturgeon is given.

H. B. F.

HETZER (Margarethe). **Studien über Protozoen, insbesondere des Darms.** [Studies on the Protozoa, particularly of the Intestine.] —*Zeitschr. f. Hyg. u. Infektionskr.* 1914. Apr. 1. Vol. 77. No. 2. pp. 304-310.

The first part of the paper consists of an account of work on amoebae obtained from stools of non-dysenteric patients taken from a medical clinic, a lunatic asylum and various other sources. The research was conducted in the Hygienic Institute of the University of Bonn. 427 such stools were examined by culture on amoeba-agar containing bouillon. The culture dishes were kept in dual sets, one of which was maintained at 22° C., the other at 37° C. They were observed daily for 8 or 10 days, the latter period being desirable as growth of amoebae often occurred on the eighth day.

In about 5 per cent. of more or less normal faeces, amoebae were recovered. They were mostly of the *limax* type, and medium sized forms were most common. Diluted faeces kept at 22° C. gave a greater number of successful cultures than undiluted faeces at the same temperature, and than cultures at 37° C. whether diluted or not. The cultural amoebae were not considered to be in genetic relation to *Entamoeba coli*, being differentiated by the structure of their protoplasm, nucleus and cyst membrane. *Entamoeba coli* cysts were found in some of the faeces examined.

Flagellates of various forms also occurred in the stools. They were usually not free forms but cysts, especially of Lamblia and Trichomonas. The author considers that the flagellates were present originally in the stools and have not arisen from the transformation of amoebae into flagellate forms, as was suggested by WASIELEWSKI.

Amoebae, flagellates and ciliates have also been obtained from food materials, air and dust. A small amoeba has been obtained especially from an infusion of lettuce leaves. Subcultures were successful. Protozoal cultures were also obtained from dust. Some amoebic cysts, from such a source, resisted a temperature of 40° C. for one hour, another set endured an exposure to 50° C. for 1 hour. Flagellates were killed after half-an-hour's exposure to 40° C.

H. B. F.

LAGANE (L.). **Les Protozoaires en Pathologie humaine.**—*Presse Méd.* 1914. Mar. 7. No. 19. pp. 181-185. With 6 text figs.

An interesting review of present day knowledge of the pathogenic protozoa of man. After some general statements the classification, morphology and biology of Entamoebae, Plasmodia and other Sporozoa, Trypanosomidae, Leishmania, Cercomonadidae, Balantidium and Spirochaetes are briefly discussed.

H. B. F.

NOC (F.). **Sur la Durée de Conservation de Protozoaires à l'Etat Humide ou Desséché.**—*Compt. Rend. Soc. Biol.* 1914. Feb. 6. Vol. 76. No. 4. pp. 166-168.

The author has investigated the duration of life of various Protozoa (Infusoria, Flagellates and encysted Amoebae) kept in hermetically sealed flasks. Part of the material consisted of sediment of drinking water of Cochinchina, kept at Paris since 1908 in 20 cc. flasks hermetically sealed. In the humid sediments thus kept for six years, no trace of Infusoria or Flagellates was found, but the amoebic cysts rsisted. The results of five sets were as follows :—

1. Water from wells, Institut Pasteur, Saigon : Some cysts, several plasmolysed.
2. Water from town of Saigon : Cysts absent in deposit.
3. Water from Bassac, Cochinchina : Cysts rare, not plasmolysed.
4. Water from a gully, Cantho : Cysts rare in the deposit.
5. Water from Nui-Ong : No cysts visible.

Cultures made on Musgrave and Clegg's medium yielded some Vahlkampfia, which are common in the water of Cochinchina, thus :—

1. Water from wells, Institut Pasteur, Saigon : Rich culture after 12 days at 25° C.
2. Town water : Amoebae appeared after a month and a-half.
3. Water from Bassac : Amoebae appeared after 10 days.
4. Water from gully : No culture after 1½ months.
5. Water from Nui-Ong : A few amoebae appeared after 12 days.

Thus after six years, moist sediments kept in the dark and without oxygen gave amoebae on culture.

The dry material used for experiment was paper made in Tonkin from native tree bark, and kept dry for 5 years. A culture on agar without peptone yielded a mixed culture of bacteria and a small

flagellate, *Oikomonas termo*. One specimen out of the three preserved gave a culture, while controls were negative. The work sheds an interesting light on the longevity of the Protozoa.

H. B. F.

Woodcock (H. M.) & Lapage (G.). **On a Remarkable New Type of Protistan Parasite.**—*Quarterly Jl. Microscopical Science.* 1913. Nov. Vol. 59. Pt. 3. pp. 431-457. With 2 plates and 2 text figs.

The authors describe a new parasitic Protist, *Selenomastix ruminantium* (Certes), found in the rumen of Ruminants, especially the goat. (See this *Bulletin*, Vol. 3, p. 121.)

The organism occurs in two chief forms—crescents and ovals. The crescents possess a single large flagellum, arising from about the middle of the concavity of the crescent. Chromatin is present in the form of a peripheral layer. Division is by binary, transverse fission. The ovals bear a general resemblance to the crescents but never possess a flagellum, though capable of movement.

The average sized crescents are 9·5μ to 11μ by 2μ to 3μ. The ovals average 7μ to 9·5μ by 3·5μ to 5μ. Numerous forms are illustrated.

The authors consider that Selenomastix is an example of a Proflagellate.

H. B. F.

Laveran (A.) & Franchini (G.). i. **Infection naturelle du Rat et de la Souris au Moyen de Puces de Rat parasitées par *Herpetomonas pattoni*.**—*Compt. Rend. Acad. Sciences.* 1914. Feb. 16. Vol. 158. No. 7. pp. 450-453.

ii. **Infection de la Souris au Moyen des Flagellés de la Puce du Rat, par le Voie Digestive.**—*Ibid.* Mar. 16. No. 11. pp. 770-772.

i. The object of this paper is to direct attention to the fact that rats and mice can be infected with *Herpetomonas pattoni*, Swingle. This flagellate occurs naturally in the gut of the rat-flea, *Ceratophyllus fasciatus*. The rats and mice used were kept in contact with numerous fleas, so much so that it was necessary to remove them from the vessel every 48 hours and submit them alternatively to 48 hours of bites and 48 hours freedom; otherwise the animals died of profound anaemia. Natural infection with *H. pattoni* was observed in two white rats and two white mice.

The rats were anaemic with hypertrophied spleens. Small leishmaniform parasites occurred in the liver. In one rat, spleen and bone marrow were examined and were not parasitised.

Of the mice, the first had parasites in the liver and spleen and especially in the bone marrow, while flagellated forms occurred in the liver. The second mouse also showed parasites but at the date of writing did not seem ill.

Rats and mice subinoculated intraperitoneally with infected rat's blood and liver emulsion, became infected. The infected rat did not appear to be ill, but a mouse was very ill when killed.

Animals inoculated direct with the flagellates of fleas or with blood or organ emulsion of infected animals show parasites in the blood 3 to 5 days after inoculation. The incubation period is longer when the animals are exposed to the bites of the fleas. The commencement of

infection is marked by the appearance of small parasites, rare or very rare, in the blood. There is need to determine whether infection arises from the bites of the fleas or whether it is produced by way of the digestive tract, by rats and mice eating fleas. Animals exposed continuously to hundreds of flea bites die of anaemia, but the pathogenic action of the flagellates on animals infected by inoculation does not seem doubtful.

Three types of parasites (*H. pattoni*) occur:—(1) Small, oval, leishmaniform bodies, some with a nucleus only, others with nucleus and blepharoplast; (2) Fusiform, nonflagellate forms, 4μ to 5μ long with nucleus and blepharoplast; (3) Oval or spherical bodies, 5μ in diameter, with a free flagellum 10μ to 12μ long, some of which were dividing.

The authors conclude by stating that since their experiments were made under almost natural conditions they have a special interest, and the results obtained are certainly favourable to the opinion of those workers who consider that the trypanosomes of vertebrates and Leishmania have originated from the flagellates of invertebrates.

ii. This interesting paper deals with experimental herpetomoniasis. White mice were used. Some of the rodents were put on a diet and after 24 hours were given a little soaked bread in which numerous drowned rat-fleas (*Ceratophyllus fasciatus*) were placed. The rat-fleas were heavily parasitised with *Herpetomonas pattoni*, about half of the fleas being found to contain flagellates, especially in their hind-guts. The mice ate the bread containing the fleas with avidity. Their blood was examined daily. Details of four such white mice, all of which became infected, are given. For example, one mouse was fed three times, at intervals of 10 days, eating about 150 rat fleas in all. Twenty days after the first feed, small uninucleate intracorpuscular parasites were seen in its blood, and some leishmaniform parasites, but no flagellates. The blood afterwards showed no parasites. Thirty days after the first feed the mouse became ill. It was killed, and its spleen was found to be enlarged. In the spleen and liver uninucleate parasites were seen, both free and intracorpuscular, and a few leishmaniform stages. The remaining three mice became infected, but were found to be well again in four to five weeks after their first infected feed.

The blood of the first mouse, which was killed, was inoculated intraperitoneally into three clean mice. All three became infected in four days, and one died, while one was killed when it became ill. The third one recovered. Leishmaniform parasites were found in the peripheral blood, and in the spleen, liver and bone-marrow after death.

Infection of the mice was by way of the alimentary canal, by swallowing the invertebrate host of the flagellate. The incubation period was 15 to 20 days, much longer than by intraperitoneal inoculation, when the period was only 4 days. The small, uninucleate forms of the parasite were devoid of blepharoplasts. The parasites, after their appearance in the peripheral blood of the host, retreated to the internal organs, especially the spleen and liver.

The authors state that they infected mice by way of the digestive tract with *Crithidia melophagia*, but no details are given.

H. B. F.

Woodcock (H. M.). i. **On "*Crithidia*" *fasciculata* in Hibernating Mosquitoes (*Culex pipiens*) and the Question of the Connection of this Parasite with a Trypanosome.**—*Zool. Anzeiger.* 1914. Jan. 20. Vol. 43. No. 8. pp. 370-382. With 41 text figs.

ii. **Further Remarks on the Flagellate Parasites of Culex. Is there a Generic Type, *Crithidia*?**—*Ibid.* Mar. 31. Vol. 44. No. 1. pp. 26-33. With 1 text fig.

i. In the first paper the author gives an account of certain flagellates observed by him in the alimentary tract of hibernating *Culex pipiens*. He considers that "the great majority were undoubtedly the much discussed '*Crithidia*' *fasciculata* of Leger." The parasites were mostly in the resting stage in the gut, but became active when brought into contact with water. The morphology is discussed and figured. In the flagellate stage no undulating membrane is present, as the author remarks, and the organism has the appearance of a typical Herpetomonas. Non-flagellate forms are also shown. No hereditary infection was found.

ii. In the second paper the author concludes that he is dealing, in *Culex pipiens*, with a leptomonad (or herpetomonad) flagellate, and not with a Crithidia as stated in the first paper. He also acknowledges that there is a genus Crithidia. The article contains much polemical matter.

H. B. F.

Kuczynski (Max H.). **Untersuchungen an Trichomonaden.** [Investigations on the Trichomonads.]—*Arch. f. Protistenkunde.* 1914. Mar. 3. Vol. 33. No. 2. pp. 119-204. With 6 plates and 4 text figs.

The author gives a long and diffuse account of the Trichomonads, basing his remarks largely on his observations of the Trichomonads of mice and guinea-pigs. He discusses the mode of life of the organisms and their distribution within their respective hosts. The various forms of supporting structures are described and the morphology is treated in some detail. The modes of movement and their mechanism receive some attention, but most of the remarks made thereon have appeared in connection with other trichomonads. Amoeboid movements are described and figured. An account of the mode of nutrition is given, the author apparently concluding that they absorb chyme from the gut of their host [which is not surprising]. Division and encystment are described, together with the history of other workers' opinions as to the nature of the same.

[To those who desire to read an abstract of recent German arguments on the Trichomonads this paper will appeal. It does not seem of much interest to tropical workers.]

H. B. F.

von Wasielewski (Th.). **Zur Kenntnis der Halteridienkrankheit der Vögel.** [On Diseases of Birds due to Halteridia.]—*Trans.* xvii *Intern. Congress of Med.* London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2. pp. 245-249.

The author gives an interesting general account of the blood diseases

of birds due to members of the genus Haemoproteus (often called Halteridium). *H. danilewskyi* is the commonest species and many varieties of it occur in different birds, e.g. *H. danilewskyi columbae* in pigeons, *H. danilewskyi falconis* in kestrels. Multiple infections with various blood parasites are common in these birds, and the pathogenicity of Haemoproteus can only be studied in birds infected exclusively with this parasite. Disease symptoms are rarely well-marked. In the author's experience of over 1,000 birds, only some half a dozen succumbed to Halteridium infection. Two forms of disease occur, one acute which is of very short duration and easily overlooked, the other chronic. Nestlings particularly are affected. *H. danilewskyi falconis*, parasitic in *Falco tinnunculus*, was especially investigated by the author. The earliest forms of the parasite could not be observed, as the nestlings are concealed during the first fortnight of their lives. Flies of the genus Lynchia transmit the parasite. Sexual forms only, and not multiplicative forms, occurred in the circulating blood. Wasielewski considers that the schizogonic stages described by Labbé really represent a multiple infection, and he ascribes the misinterpretation by Labbé as being due to the technique available at the time of investigation. The paper concludes with a comparison of the structure and biology of a Haemoproteus with that of a human malignant tertian parasite, showing well the many similarities existing between the two organisms.

In a discussion following, Gonder remarked that *Haemoproteus columbae* in South Africa is transmitted by *Olfersia capensis*, a Hippoboscid fly. The infective stage in the fly is the oökinete.

H. B. F.

Wolbach (S. B.). **Notes on the Life-Cycle of a Hemogregarine found in a Monitor** (*Varanus niloticus*).—*Jl. of Med. Research.* 1914. Jan. Vol. 29. No. 3. pp. 473-488. With 2 plates.

Previously the author has described forms of the haemogregarine from blood films of the monitor killed at Lamin Kota, in the Gambia. A short résumé of this is given, together with an account of the schizogony of the haemogregarine. The blood forms were (a) large, encapsuled forms with a central nucleus 10·3μ by 2·5μ; (b) small forms, 6μ by 3μ, but some intermediate-sized ones occurred. A third distinct type has since been discovered, a short, oval form with "a large amount of nuclear material distributed in belt-like strands," and having extra-nuclear granules. No multiplicative forms have been found in the blood, but various stages in schizogony were found in the heart, lungs, liver, spleen, kidney and in the walls of the stomach and intestine. The multiplicative forms were most abundant in the lungs and liver. Excepting occasional merozoites, young schizonts and vermicular forms which were free in the capillaries, the various stages of the parasite were always within endothelial cells, which usually remained *in situ*.

The forms in the organs are described and their dimensions are given. The two common types of multiplication-cysts are those containing 8 and 64 merozoites. Cysts containing intermediate numbers occur. Other forms of cysts may be found and are described. The schizonts are always oval. A nucleolus may be present. In

schizonts producing about 64 merozoites the nucleoli are not visible, but in schizonts producing but 8 merozoites they persist [nucleolus = karyosome ?]. The macro- and micro-merozoites may represent an early sexual differentiation.

The liver excepted, "the only effect of the presence of the parasite is phagocytosis by individual endothelial cells, so that even microscopical lesions were not produced." The liver has "small tubercle-like areas, composed wholly of endothelial cells, most of which contain the parasite."

The last 6 pages contain a discussion of the results of other workers on the haemogregarines of Varanus, and the author considers the present study gives additional evidence for the classification of haemogregarines of this type among the Coccidia. The name *H. toddii* is proposed, should the parasite prove to be a new species.

H. B. F.

Sangiorgi (G.). *Leucocytogregarina cuniculi*, n. sp.—*Pathologica.* 1914. Jan. 15. Vol. 6. No. 125. pp. 49-50. With 3 text figs.; and *Giorn. d. R. Accad. di Med. di Torino.* 1914. Jan-Feb. Vol. 77. No. 1. pp. 25-29.

The author describes a new species of Leucocytogregarina found in smears of the enlarged spleen of a rabbit examined post mortem. The majority of the forms were elongate, they were concave at one side, possessed rounded extremities and showed a large nucleus which was not always centrally situated. The nucleus contained numerous large chromatin granules. A clear space corresponding to the capsule and very refractile to stains often surrounded the parasites, which averaged 16·6μ to 18·2μ long and 4·1μ to 4·9μ broad. Sometimes the organisms were extracellular, sometimes in splenic elements. Smaller forms occurred in large, mononuclear leucocytes. No multiplicative forms were seen. On account of its morphology and biology the author designates it *Leucocytogregarina cuniculi*, n. sp.

The author concludes with a review of the literature relating to the classification of the Haemogregarinidae. He proposes to make two sub-families:—Haemogregarininae for the haemogregarines of the erythrocytes of mammals and Leucocytogregarininae for the Leucocytogregarines parasitic in mammalian leucocytes. A list of the species is given. The paper is illustrated by three text-figures.

Mention is made of three new mammalian leucocytogregarines recently (1913) described from Eritrea and Italian Somaliland by Martoglio, viz. *L. rotundata canis familiaris*, *L. plicata marmotae* and *L. arvalis*.

H. B. F.

Carini (A.) & Maciel (J. J.). i. **Infections des Toxoplasmose et de Paralysie bulbaire infectieuse par les Muqueuses saines.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 111-114. ii. **Infecção de Toxoplasmose e de Paralysia bulbar infectuosa pelas Mucosas sans.**—*Brazil Medico.* 1914. Feb. 1. Vol. 28. No. 5. p. 41.

These two papers contain the same matter.

In their experiments on toxoplasomosis the authors used strains

obtained from two cases of natural infection with *Toxoplasma canis*. They had already been able to infect pigeons therewith. The toxoplasms can traverse the buccal and gastro-intestinal mucosa of the pigeon. When the healthy buccal mucosa was painted over with an emulsion containing numerous parasites the animal was found to die in 16 days, and many typical toxoplasma were found in its organs.

Also, if a drop of fluid containing parasites was placed on the bird's eye, the pigeon generally died after a time.

H. B. F.

SARRAILHÉ (A.). **Notes sur la Toxoplasmose Expérimentale.**—*Bull. Soc. Path. Exot.* 1914. Mar. Vol. 7. No. 3. pp. 232-240.

The object of the present paper is to give the results of investigations as to the mode of resistance of *Toxoplasma gondii* outside the body of the host. The virus, obtained from the Institut Pasteur, Tunis, was kept in mice. A good series of conclusions is given, of which the most important points seem to be the following :—

(1) *Toxoplasma gondii* is relatively resistant to external influence. Though encysted forms do not occur, it lives and maintains its infectivity as long as 17 days outside the host, at a temperature between 0° C. and 25° C. At 37° C. it rapidly loses its vitality. *T. gondii* can resist putrefactive bacteria and is capable of infecting after being 50 hours in a corpse.

(2) When the virus was warmed to 45° C. for 2 hours, and then inoculated it proved infective but the incubation period was prolonged. Warmed in other cases to 45°, 48·5°, 50°, and 52·5° C. for the same time, the virus lost its infectivity but did not confer immunity on the subinoculated animals.

(3) *T. gondii* resists the action of distilled water for as long as 15 minutes, but not longer.

(4) Various sera, including human, Cynocephalus, rat, had either no, or extremely slight, action on the fresh virus when mixed with it. Sera of animals in course of infection gave no protection to animals inoculated with virus-serum.

(5) Experiments have shown that a virus even at a dilution of 1 per 100,000 is infective to mice by intraperitoneal inoculation.

(6 Though *Toxoplasma gondii* is not common in the circulating blood, peritoneal inoculations of mice with 1, 5 and 15 drops of heart blood from an infected mouse have reproduced the disease.

Tables in illustration of the various results are given, and details of the exhaustive series of experiments are set forth.

[To those interested in the inoculability and extracorporeal life of the parasite, the present paper cannot fail to be of great value and should be consulted in the original.]

H. B. F.

ARANTES (J. B.). **Toxoplasmose. Evolução do *Toxoplasma canis* no Systema Nervoso do Pombo e as Lesões por ella produzidas. (Nota preliminar.)** [Toxoplasmosis. The Evolution of *Toxoplasma canis* in the Nervous System of the Pigeon and the Lesions produced by it. (Preliminary note.)]—*Brazil Medico.* 1914. Apr. 15. Vol. 28. No. 15. p. 144.

A note on the appearance presented by the nervous system of the

pigeon after experimental inoculation with *Toxoplasma canis*. Whilst smears from the liver and the lung gave negative results, those made from brain substance showed a large number of parasites in different stages of evolution. Sections of the brain showed disintegration of the nervous tissue with infiltration by leucocytes, the appearances being similar to those met with in Chagas's disease after rupture of the cyst of the trypanosome. With a higher power it could be seen that many of the leucocytes contained parasites. The phenomena seem to be due to embolism of the arterial capillaries of the brain by parasites, which proceed to form cysts, which afterwards rupture into the nervous tissue.

J. B. Nias.

Migliano (Luiz). **Os Toxoplasmas.**—These apresentada á Faculdade de Medicina do Rio de Janeiro no dia 29 de Setembro de 1913, e defendida no dia 20 de Dezembro de 1913.—76 pp. With 5 figs. 1913. Rio de Janeiro: Typ. de Martins de Araujo & C.

The thesis is divided into two parts, general and special. The first part consists of five chapters dealing with the history, morphology, biology, classification and pathogenicity of Toxoplasma. The second part deals with *Toxoplasma cuniculi*, *T. gondii*, *T. canis*, *T. talpae*, *T. musculi*, *T. columbae* and *T. avium*. There is a bibliography. There are 5 figures, most of them after well-known authors. The work was done in Carini's laboratory in Sao Paulo and the subject has been summarised from time to time in this Bulletin.

H. B. F.

Castellani (Aldo). **Note on Certain Protozoa-like Bodies in a Case of Protracted Fever with Splenomegaly.**—*Jl. Trop. Med. & Hyg.* 1914. Apr. 15. Vol. 17. No. 8. pp. 113-114. With 2 plates.

Plate (Ludwig). **Brief Note on *Toxoplasma pyrogenes*, Castellani,** 1913.—*Ibid.*, Apr. 1. No. 7. p. 98. With 3 text-figs.

In the first paper Castellani describes certain bodies found in the spleen of a Sinhalese boy suffering from splenomegaly with fever of long standing, who died when aged 14. He had suffered from malaria when 3 years of age. "The fever, while the patient was in hospital, was generally intermittent." "The spleen was much enlarged and hard, the liver slightly enlarged, neither organ was tender on pressure. All other organs were normal."

The bodies were extremely rare in the blood. "They are roundish or pear-shaped, with a maximum diameter of 7 to 12 microns, most of them are vacuolated. The protoplasm by Giemsa stains a pale blue and several large masses of chromatin are present."

Two types of bodies were found in the spleen. "Some, of extreme rarity, are identical to those found in the blood; others, the enormous majority, are different. The latter . . . . are roundish, oval, or crescentic bodies, $2\frac{1}{2}$ to 6 microns in maximum diameter, with protoplasm staining blue, and generally one large roundish mass of chromatin at one pole or in the middle. In one instance the faintest appearance of a flagellum seemed to be present. Occasionally the bodies are larger, roundish or pear-shaped, and have two chromatin

masses, one at each pole or close together. The bodies are generally free; only in one specimen did I find some contained in a leucocyte. Those which have two chromatin masses have quite a different appearance from the Leishman's bodies, being larger and more spherical, and give the impression of being either parasites preparing for division, or fusion forms."

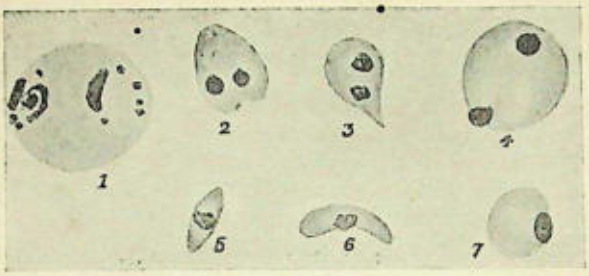


Fig. 1, Body found in the blood. Figs. 2–7, Bodies found in the spleen. [Redrawn from a coloured plate illustrating Dr. Castellani's paper in the *Jl. Trop. Med. & Hyg.* 1914. Apr. 15.]
The magnification is not stated, but Fig. 1 corresponds in size to a red corpuscle shown alongside it in the plate.

In May 1913, Castellani named the bodies *Toxoplasma pyrogenes*. He discusses the nature of the bodies found and has shown them to several medical men and zoologists. In conclusion Castellani writes :— "Personally I am still inclined to consider the bodies found in the spleen to be toxoplasmata, though I quite admit that the appearance of some of them give the impression of their being anaplasmata, or piroplasmata which have infected basophile red cells."

The paper is illustrated by a coloured plate of 25 figures and also by a series of photomicrographs.

In the second article, Professor Plate, of Jena, briefly states the results of his examination of Castellani's preparations. The bodies were quite evident. He is convinced that the bodies "are not degenerated red cells, nor degenerated blood platelets, nor degenerated tissue of any kind." The bodies are "without any doubt of protozoal origin and differ from any other protozoal organism so far described in man; but no conclusion can as yet be come to as regards their being toxoplasmata or not; in fact, no conclusion can be arrived at as regards their exact zoological classification."

H. B. F.

LAVERAN (A.) & MARULLAZ (M.). **Sur la Nature des Corps de Graham-Smith.**—*Bull. Soc. Path. Exot.* 1914. Mar. Vol. 7. No. 3. pp. 240-246. With 1 plate.

The present paper consists of an exhaustive review of the accounts given by various workers of the morphology, staining reactions and probable nature of the bodies first described from the erythrocytes of moles by GRAHAM-SMITH in 1905. Similar bodies have been described since not only from moles but from various mice, rats and gerbils. Many authors appear not to have seen the nuclear structures

shown in the original plate of GRAHAM-SMITH. Some regard the bodies as parasites [*Grahamella talpae*, Brumpt], others as cell enclosures. The present work of Laveran and Marullaz on the bodies in moles was supplemented by examinations of the structures in the blood of rats, mice and gerbils from various sources, the results of which are represented in a plate of 42 figures. Very great variation in size and form are shown. Karyosomatic structures, such as depicted by GRAHAM-SMITH, were never seen. The evidence for or against the true parasitic nature is considered to be still inconclusive. Staining reactions vary, the structures have not been seen in fresh preparations, attempts at inoculation and culture have failed. It is considered probable that the bodies are of the same nature as the basophile granulations common in the erythrocytes of newly born animals and in anaemia. They appear to arise from the disintegration of the erythrocytes that are newly formed.

H. B. F.

GALLI-VALERIO (B.). *Smithia talpae*, **n. sp.** (*Piroplasmidae*) **chez** *Talpa europaea*, **L.**—*Centralbl. f. Bakt.* 1. Abt. Orig. 1914. Feb. 25. Vol. 73. No. 2. pp. 142-143. With 1 text fig.

The author discovered the organism which he names *Smithia talpae* in the blood of two moles sent to him from Malleray, Jura Bernois. The parasites were rare, perhaps, as suggested by the author, because the blood had coagulated and so it was difficult to make preparations. The parasites occurred in erythrocytes and presented two forms :—(1) Single, piriform bodies, almost the diameter of the red corpuscle. They were 3μ to $4{\cdot}5\mu$ long by 1μ to 2μ broad. (2) Round or oval forms, always situated peripherally, and one only in each erythrocyte. Multiplicative forms were not found. The parasite is considered to be a new species of the genus Smithia (whose characteristics are given), and to have no connection with *Grahamella talpae* or *Elleipsisoma thomsoni*.

H. B. F.

DELANOË (M. et Mme. P.). **De la Rareté de** *Pneumocystis carinii* **chez les Cobayes de la Région de Paris. Absence de Kystes chez d'Autres Animaux (Lapin, Grenouille, 3 Anguilles).**—*Bull. Soc. Path. Exot.* 1914. Apr. Vol. 7. No. 4. pp. 271-272.

The authors give an account of a series of observations made by them on the occurrence of pulmonary cysts in guinea-pigs obtained in the neighbourhood of Paris. Of these guinea-pigs two were inoculated with *Trypanosoma pecaudi*, two with *T. rhodesiense* and six with *T. cruzi*. One only showed pulmonary cysts, containing eight vermicules, identical with those described by CARINI from rats infected with *T. lewisi*. This guinea-pig was inoculated with *T. pecaudi* and details are given of the guinea-pig's history. Trypanosomes were numerous in the blood when the host was killed. The authors conclude that *Pneumocystis carinii* (see this *Bulletin*, Vol. i, p. 58) does not represent

a stage of evolution of a trypanosome any more in guinea-pigs than it does in rats. Cysts occurred only in lung smears, not in those of other organs.

No cysts were found in organ smears of a rabbit infected with *T. rhodesiense*, neither did they occur in organ smears of a frog (*Rana esculenta*) infected with haemogregarines, *Bacillus krusei* and *Tryp. rotatorium*. Three eels (*Anguilla vulgaris*) also yielded no cysts. Smears from the gills, however, showed dividing forms of *T. granulosum*. The authors also note that a very sparse infection of a large trypanosome, containing large, bacilliform granulations anteriorly, was present in an eel.

H. B. F.

Acton (H. W.) & Knowles (R.). **The Nature of the Kurloff Body: A Stage in the Development of the Eosinophile Leucocyte.**—*Indian Jl. Med. Research.* 1914. Jan. Vol. 1. No. 3. pp. 523-531. With 1 coloured plate.

Kurloff bodies were found by the authors in birds (e.g. pigeons) as well as in guinea-pigs. They were most common in the bone marrow and liver of pigeons and rare in the peripheral blood. Fairly thick smears were made and fixed in hot sublimate alcohol. The stains used were iron-haematoxylin and Giemsa. The authors extended their researches and carefully studied granule containing leucocytes in birds, reptiles and amphibia.

The following structures are stated to be analogous and to be derived in the same manner from the nucleolar archoplasm:—The archoplasm of the spermatid with its *Initial Körper*, the permanent granules in the leucocytes, and the secretogen granules formed by pancreatic and venomous cells.

The authors' conclusions are as follows:—

1. The Kurloff body is found in the bone marrow of widely different animals, birds, amphibians, and mammals, and is not confined to the guinea-pig. It cannot, therefore, be a parasite.

2. It is a phase in the development of the eosinophile cell and is identical with the structure known as an archoplasmic vesicle.

3. The Kurloff bodies are, therefore, the bone marrow representatives of the granules of the eosinophile leucocytes, and their appearance in the peripheral blood of the guinea-pig or other animal may be associated with helminthic infections.

4. The Kurloff body is formed by the nucleolus in an exactly similar manner to other zymogen granules.

We are, therefore, able to confirm Ehrlich's and Kurloff's view as to the nature of these bodies: they contain *Secretin Stoff*.

5. The eosinophile granules are derived from the nucleolus and are of the nature of zymogen granules.

6. The phases in development seen in these archoplasmic vesicles from the *Initial Körper* to the formation of the spireme stage, coincide exactly with the stages described by E. H. Ross in the development of the *Lymphocytozoon cobayae*: and by Hartmann and Prowazek for Chlamydozoa.

H. B. F.

(1) Schilling-Torgau (V.). **Ueber die feinere Morphologie der Kurloff-Körper und ihre Aehnlichkeit mit Chlamydozoen Einschlüssen. II. Mit einem Zusatz über Rosssche Einschlüsse bei Syphilis.** [On the finer Morphology of the Kurloff Bodies, and their Resemblance to Chlamydozoal Inclusions.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. June. 21. Vol. 69. No. 5/6. 412-434. With 2 plates.

(2) Schilling-Torgau (V.). **Berichtigung zu Kamil Schulhof: Studien über die Kurloffkörper nebst Beiträgen zur vergleichenden Hämatologie.** [A Correction to K. Schulhof's paper "Studies on the Kurloff Bodies, together with Contributions to Comparative Haematology."]—*Folia Haematologica.* (Archiv.) 1914. Jan. Vol. 17. No. 4. pp. 442-446.

(3) Schulhof (K.). **Entgegnung auf V. Schillings "Berichtigung" zu meinen "Studien über Kurloffkörper."** [Reply to V. Schilling's "Corrections" to my "Studies on the Kurloff Bodies."]—*Ibid.* pp. 447-451.

These three papers deal with the highly controversial subject of the Kurloff bodies, found in the blood of guinea-pigs, so often used for laboratory purposes.

(1) The first paper gives a summary of the conflicting opinions of the principal workers with regard to the morphology, nature and significance of the Kurloff bodies, and then the further results of Schilling's observations are detailed. Observations on fresh, unstained Kurloff bodies showed them to possess a refractile, mobile, fluid ground substance, with a denser upper surface, while very fine granules exhibiting molecular motion occurred in the ground substance. Observations on Kurloff bodies stained intra vitam never gave evidence that the whole inclusion, in the sense of Patella, was of a parasitic nature, or that there was necessarily a parasitic nature to the ground substance (Flu). No evidence of spirochaetiform parasites nor of free parasitic Lymphocytozoa (Ross) could be obtained. The effect of staining Kurloff-bodies with Azur II, alone or with other stains, is fully discussed and figured. The identification of the ground substance, Azur-figures, pseudonucleus and intermediate granules is discussed and the conclusion reached is that the Kurloff bodies are cell reaction products formed by a complicated process, and having some resemblance with those resulting from the action of Chlamydozoa. The structural elements are not organisms, but from their morphological characters may be near to the lipoids or of special protoplasmic or archoplasmic structure.

(2) The second paper by Schilling-Torgau consists of a protest against criticisms of his work on the Kurloff bodies made by K. Schulhof. A series of quotations from Schilling's work on the subject from 1911 onwards is given to support the statement that his attitude with regard to these structures has been consistent. He has frequently stated his conviction that the Kurloff bodies as entities are most probably cell reaction products of a complicated structure, having some similarity with those produced by the Chlamydozoa.

(3) Schulhof in the third paper replies to the remarks of Schilling in (2). He contends that Schilling's corrections—(1) that the Kurloff

bodies are physiological structures, (2) that they are homogeneous and the supra-vital, colourable structures in them only arise from the stains used—are premature.

[We fail to see what useful purpose this controversy serves. It is to be regretted that the energy wasted thereon has not been applied to constructive work. It is a relief and a pleasure to turn from such polemics to a definite constructive memoir like that of ACTON and KNOWLES.]

H. B. F.

SLEEPING SICKNESS.

GERMAN EAST AFRICA. **Sleeping Sickness in German East Africa.**—Report, dated Mar. 10, 1914, from His Britannic Majesty's Vice-Consul at Daressalam, received at the Colonial Office 23 April 1914.

A translation is given of an article on the state of sleeping sickness in German East Africa which appeared in the *Deutsch Ostafrikanische Zeitung*. The data were obtained from Professor KLEINE.

The three principal foci of sleeping sickness in German East Africa are the shores of Tanganyika and Victoria Nyanza, and the Rovuma River. The disease in the last named region is caused by *T. rhodesiense*, whilst that in the other two places is due to *T. gambiense*. An account is given of the measures taken to combat sleeping sickness in the Victoria and Tanganyika districts. They have been followed by complete success in the former region. The principal object of the officials is to prevent the introduction of fresh cases. Two isolation camps have been constructed, in the Shirati and in the Bukoba districts.

The most widespread and most dangerous seat of infection is the Tanganyika coast and it is very important to take steps to control the disease now that the railway has reached the lake. Apart from the actual treatment of sick cases, the principal efforts of the Government are directed towards preventing the introduction of fresh cases and controlling the traffic. In addition to this, efforts are being made to clear the country by destroying the bush. The policy of clearing the people out of an infected area without settling them in a healthy spot, as was done at first, proved unsatisfactory owing to the fact that the infection continues for a considerable period in the fly and in many warm blooded animals. It is now considered that the danger which threatened German East Africa from sleeping sickness in Tanganyika has been averted. Recently there has been a considerable decrease in the number of cases recorded. The difficulty of contending against sleeping sickness is greatly increased by the state of affairs in the Belgian Congo. No natives from German East Africa are allowed to act as porters in the Belgian Congo.

W. Yorke.

D'ALMEIDA (T.). **Sezonismo—Syphilis—Trypanosomiase.** (Excerpto de Licção). [Fever, Syphilis, Trypanosomiasis. (Extract from a Lecture).]—*Medicina Contemporanea*. 1914. Mar. 8. Vol. 32. No. 10. pp. 75-79.

An extract from a clinical lecture on a case of combined malaria, syphilis and trypanosomiasis in a soldier invalided from the Portuguese army on account of these symptoms, containing nothing of special interest. The malaria and syphilis were treated with quinine and intramuscular injections of mercury, and in addition a commencement was made of treatment with salvarsan for the trypanosomiasis. The patient however left hospital, and the ultimate issue of the case is not

stated. The trypanosome infection appears to have been acquired in Angola.

J. B. Nias.

MACFIE (J. W. Scott). **On the Pathogenicity of the Trypanosome (*T. nigeriense*) from a Case of Sleeping Sickness from Eket, Southern Nigeria.**—*Ann. Trop. Med. & Parasit.* 1914. Apr. 21. Vol. 8. No. 1. pp. 29-40.

This paper records the continuation of the author's previous work on the pathogenicity of a human trypanosome from Nigeria (see this *Bulletin*, Vol. 2, p. 344).

All the inoculations, with the exception of two, were subcutaneous and the quantity of infective blood employed was in each case small. In most of the animals which became infected trypanosomes were scanty. Parasites of the small type characteristic of the strain [see previous paper] were seen in all the animals in which the trypanosomes appeared in moderate numbers. Details of the experiments are given in tables. Eight rats (2 black and 6 white) were inoculated; trypanosomes appeared in only one of them, on the 59th day; the animal was alive and well on the 69th day. Three of the rats died on the 7th, 10th and 14th days respectively from intercurrent disease. Seven wild mice were inoculated with 3 positive results. Trypanosomes were found in the blood of these animals on the 5th, 7th and 9th days respectively. The first two died on the 51st and 11th days, but the third was alive and well on the 107th day after inoculation; trypanosomes were always scanty. Twelve experiments were carried out with guinea-pigs; three became infected and nine did not. The disease was very chronic and the animals presented no signs of illness. Of seven dogs inoculated only one became infected, parasites appearing in its blood for the first time on the 85th day. The animal was alive and well on the 115th day after inoculation. Two monkeys became infected on the 11th and 8th days respectively. The disease ran a chronic course and the animals were both alive at the time of writing, 137 and 118 days after inoculation. One of two goats became infected, but trypanosomes were seen in its blood on two occasions (the 63rd and 65th days) only.

The author writes that these experiments indicate the slight degree of pathogenicity of the Nigerian trypanosome. Of the 38 animals inoculated only one had died of trypanosomiasis up to the time of writing. In order to compare the pathogenicity of this strain with that of various strains of *T. gambiense*, the author reproduces the table constructed by YORKE, in which are given the results of inoculations of human trypanosomes obtained by different observers.* The Nigerian trypanosome differs from all the other strains in its slight degree of pathogenicity to rats and dogs. Its virulence is unlike that of any of the strains of *T. gambiense* mentioned in the table, a fact which, in the author's opinion, furnishes additional evidence in favour of the Nigerian strain being a new species of human trypanosome.

W. Y.

* *Ann. Trop. Med. & Parasit.* 1910. Vol. 4. No. 3. p. 367.

TREATMENT.

MOUCHET (R.) & DUBOIS (A.). **Essais thérapeutiques dans la Trypanosomiase humaine.**—*Beihefte z. Arch. f. Schiffs- u. Tropenhygiene.* 1914. Mar. Vol. 18. Beiheft. 3. pp. 5-36. [pp. 85-116.] With a map.

The authors were engaged on sleeping sickness work in the middle Congo district during 1911 and 1912. This district is about 500 km. long and extends along the left bank of the Congo from the Pama in the north to the Inkisi (near Leopoldville) in the south. The population is sparse (76,000 people in an area of about 60,000 sq. km.). In some villages as many as 10–12 per cent. of the population are infected, but on an average the number is only about 4–5 per cent.

In their tours through the district the authors employed salvarsan and arsenophenylglycin for the purpose of treating cases of sleeping sickness, with a view to preventing the spread of the infection. They give the following summary of their results :—

1. Treatments which produce prolonged sterilisation appear to us to play a considerable part in the prophylaxis against trypanosomiasis in this district.
2. Salvarsan and arsenophenylglycin injected in moderate doses produce sterilisation of about 3 months' duration, sometimes much more.
3. Single injections of salvarsan or arsenophenylglycin produce in certain cases apparent cure (*therapia sterilisans magna*).
4. Injections of salvarsan or arsenophenylglycin or of the one and the other repeated at many months' interval give in certain cases, in the first stage of the disease, a good number of apparently definite cures. From this point of view they are the best medicaments to employ prophylactically.
5. With these products as with other drugs one cannot assert that a cure is definite even after several months of observation.
6. Discontinuous treatment is not to be recommended in patients who are in the second stage of the disease.
7. Arsenophenylglycin given in repeated small doses has not exhibited any particular toxic action, nor however has it produced any notable curative effect, on patients in the second stage of the disease.
8. Atoxyl administered in massive doses in association with potassium emetic often produces fairly long sterilisation.
9. Orpiment has little action in moderate doses and is dangerous in large doses—it is impossible to entrust it to persons unaccustomed to the drug.

The routine method of treatment adopted for the most part by the authors was atoxyl and potassium emetic. Atoxyl was given on Monday in doses of ·5 to 1 gm. and the emetic on Thursday in doses of ·1 gm. Such treatment was continued for 4 to 6 months. The total amount of atoxyl which the patients received was 10 to 20 gm. and of emetic 1·75 to 2·5 gm. In all, 97 patients were treated regularly in this manner; of 28 in the first stage of the disease, who were under observation for a sufficient period, 5 were worse and 23 apparently cured, 12 of the latter being free from trypanosomes for more than a year. The results are the more favourable when it is remarked that of the five who were not benefited three were bordering on the second stage of the disease and one had relapsed after a previous treatment. In the second stage of the disease it is necessary to treat uninterruptedly for a long period. When the general condition is good and the lymphocytosis in the cerebrospinal fluid only slight, a certain amount of success and even some definite cures have been obtained.

Atoxyl alone, 1 gm. per week in robust patients in the first stage and ·5 gm. in those in the second stage, has been administered in many instances. Tolerance to such doses is very marked. Several patients have borne 25 to 30 gm. of atoxyl but there were some accidents to deplore. There were 5 cases of ocular trouble and 2 of locomotive disturbance. Three of these, occurring in patients still in the first stage, were certainly of arsenical origin. Amongst patients in the first stage so treated there were several apparently definitely cured; the results obtained with those in the second stage were inferior to those obtained by combined treatment of atoxyl and emetic.

Arsacetin was employed in 40 cases, who were either in the second stage or had not been benefited by other treatment. Three or four injections of 1 gm. were given at weekly intervals and then ·5 gm. The injections were well borne. The results were similar to those obtained with atoxyl.

Soamin was given to 21 cases mostly in the second stage. Of the 13 cases in the second stage who received 20 to 30 injections of ·5 to 1 gm., 3 are dead, 4 are worse, 2 have disappeared and 4 have benefited. It is too soon to write of those treated in the first stage of the disease.

Experiments were also conducted with "emetique d'Yvon" which contains both arsenic and antimony. It is given intravenously and stands boiling. It is tolerated in fairly large doses and up to ·2 gm. was given. In many individuals doses larger than ·15 gm. produced syncope, nausea and vomiting. The drug appeared to cure a number of persons in the first stage, but in the second stage it only produces more or less transient amelioration. A few cases were treated with tryparosan with unsatisfactory results; the drug was given by the mouth. Similarly unfavourable results were obtained with trypasafrol in the few cases to which it was given.

W. Y.

HALBERSTAEDTER. (L.). **Zur Chemotherapie der experimentellen Trypanosomeninfektion.** (Berlin. mikrobiologische Gesellschaft, 1913. 6th Feb.) [On the Chemotherapy of Experimental Trypanosomiasis.]—*Berlin. klin. Wochenschr.* 1913. Vol. 50. No. 9. p. 418.

The author refers briefly to the results obtained by various workers with mercury, both alone and in combination with other drugs, in trypanosomiasis. When he had convinced himself that mercury compounds themselves had no action on the course of nagana infection in mice, he decided to combine them with trypanocidal remedies. He used at first aethylhydrocuprein. This preparation was administered alone in such doses that it produced at no time a certain influence on the trypanosome infection. On the contrary when mercury was injected at the same time, the trypanosomes were cleared from the blood. Many different preparations of mercury were used with equal success, but it was invariably found that very large doses were necessary—doses which were toxic or even lethal. Moreover the trypanosomes were only affected when the infection had not progressed far; they disappeared transiently from the blood and in all cases relapses occurred; and frequently the treatment exerted no definite influence on the infection. Sub-

sequently, mercury preparations were combined with arsacetin and results obtained somewhat similar to those with aethylhydrocuprein.

Excellent results were obtained, however, by combining mercury preparations with salvarsan. The quantity of salvarsan used was $\frac{1}{2}$ to $\frac{1}{4}$ of the really active dose. Single administrations of relatively small doses of mercury were sufficient to drive the trypanosomes out of the blood in infections already far advanced. Mercury salicylate was mostly used. By employing large, almost toxic, doses of this remedy in combination with salvarsan definite sterilisation was produced even in heavy infections. Small doses of mercury salicylate caused merely temporary disappearance of the parasites from the blood. Similar results were obtained with sublimate and mercuric iodide.

It appears that the combination of mercury with salvarsan is far better than that of mercury with other preparations.

W. Y.

DANYSZ (J.). **Essais de Chimiothérapie. Combinaisons des Sels d'Argent et des Composés Arsenicaux dans le Traitement des Trypanosomiases Expérimentales et de la Syphilis chez l'Homme.**—*Ann. Inst. Pasteur.* 1914. Mar. Vol. 28. No. 3. pp. 238-256.

A study of the antiseptic properties of the different metallic salts and of the action of these salts on normal blood and on specific sera led the author to conclude that of all these products the silver salts possess the greatest microbicidal power in relation to their toxicity and that they modify the antitoxic and antimicrobic properties of normal or immune sera least.

He then studied the therapeutic value of salts of silver, notably the azotate, but quickly found that in the pure state silver salts exerted little action. Very dilute solutions (1 in 80,000 to 1 in 100,000) had no effect on microbic infections, whilst introduction of stronger solutions was followed by damage to the veins and tissues. It was therefore decided to combine silver with other substances possessing special affinities for certain micro-organisms. Silver was first combined with the aniline dyes and subsequently many other combinations were used, but the combination of silver salts and dioxydiamidoarsenobenzol gave results superior to all others.

The author used compounds composed of the chloride, bromide or iodide of silver and of dioxydiamidoarsenobenzol. A brief description of the preparation of these products is given. He has tested the therapeutic value of the compounds on animals infected with trypanosomes (*T. evansi*, *T. rhodesiense* and *T. dimorphon*) and spirochaetes (*S. gallinarum*, *S. duttoni*, syphilis in man and experimental syphilis in the rabbit). The author designates dioxydiaminoarsenobenzol chloroargentique "ACA," the bromine compound "ABA," and the iodine compound "AIA." The proportion of chloride, bromide or iodide of silver in combination is indicated by a figure; thus a combination of one molecule of chloride of silver with three molecules of dioxydiaminoarsenobenzol is designated "ACA^3."

The toxicity of the three products is almost the same. Rabbits of 2·7 to 3 kilo. tolerate an intravenous injection of ·2 gm. dissolved in 20 cc. of water. Guinea-pigs of 350 to 500 gm. tolerate intra-

muscularly 3 cgm. dissolved in 3 cc. of water, and mice of 16 to 22 gm. stand a subcutaneous injection of 2·5 mgm. dissolved in 1 cc. of water. An injection of 11 cgm. per kilo. killed one of three rabbits, 10 cgm. per kilo. killed two of four guinea-pigs and 3 mgm. killed one of three mice weighing 20 gm. The toxic dose is therefore 10 cgm. per kilo., whilst the largest dose tolerated is 7 to 8 cgm. per kilo.

In his therapeutic experiments the author used chiefly mice infected with *T. evansi*. The bromine compound (ABA[3]) was found to be much more active than the other two; ·07 mgm. given at a single injection 60 hours after inoculation cured mice. The dose tolerated is 2·5 mgm. and hence the toxic dose is to the curative dose as 36 is to 1. The product is 3 times more active than salvarsan and 35 times more active than atoxyl.

As a result of further work with this product (ABA[3]), it was determined that cures were obtained more certainly and with smaller doses when treatment was commenced soon after infection; and that frequently repeated injections of small doses give better results than the same quantity given at a single dose. Where one cannot with absolute certainty obtain a definite cure by a single injection, several doses spaced at sufficiently short intervals of time are indicated. If the first injection causes the parasites to disappear from the circulating blood for some days, the second should be given before their reappearance, and a third will have still better effect.

Other experiments showed that the compound ABA[3] was almost as active in the case of infections due to *T. rhodesiense* and *T. gambiense* as in those due to *T. evansi*. Mice infected with *T. rhodesiense* were cured by a single injection of ·1 mgm. of ABA[3] alone and of ·04 mgm. when combined with trypanred. On the other hand doses of 1 and even 2 mgm. of ABA[3] only delayed death for some days in the case of mice infected with *T. dimorphon*.

In spirillosis of fowls the product ACA[4] proved to be much more active than salvarsan. Details are given of the treatment of a number of cases of human syphilis with ABA[3].

W. Y.

YORKE (Warrington) & BLACKLOCK (B.). **Antimony Trioxide in the Treatment of Experimental Trypanosomiasis.**—*Ann. Trop. Med. & Parasit.* 1914. Apr. 21. Vol. 8. No. 1. pp. 55-72.

The authors experimented with antimony trioxide or "Trixidin," controlling and extending some of the work of KOLLE, HARTOCH, ROTHERMUNDT and SCHUERMANN (1913) on the use of this drug in trypanosomiasis.

"The drug was administered intramuscularly as a rule, but intraperitoneal and intravenous injections were also used in some cases. For the intramuscular injections 10 per cent. and 40 per cent. suspensions of the drug in oil were prepared: for the intraperitoneal injections 1 per cent. suspension in 0·9 per cent. sodium chloride solution was used. As the latter suspension quickly deposited, it was found unsuitable for intravenous injection. In order to overcome as far as possible this difficulty, the drug was reduced by special means to an exceedingly fine powder which was suspended in distilled water. The suspension was allowed to stand in a cylinder for 18 hours, after which time the upper portion was decanted off. The amount of antimony trioxide contained in these suspensions was found to vary from 0·13 to 0·35 per cent.

"The intramuscular method of administration possessed distinct advantages over the others, and was followed by much more beneficial results."

Various strains of trypanosomes were used in the experiments The results obtained are summarised thus by the authors : —

"1. As regards the amount of antimony trioxide which can be given at a single dose without causing toxic effects, either local or general, it was found that, as is generally the case, a relatively much larger quantity is borne by small than by large animals. At least 1 mg. per 10 grms. of body weight can be administered intramuscularly, or intraperitoneally to rabbits guinea-pigs, rats and mice without any untoward result. In donkeys and dogs, on the other hand, such a dose frequently caused death, and even much smaller doses were followed by abscesses at the site of inoculation."

"2. Although the amount of drug administered can be regulated, we have, unfortunately, no control over the amount or rate of absorption. Post-mortem evidence proves that the proportion absorbed during a period of six months is exceedingly small. Probably this factor explains the somewhat unsatisfactory and contradictory results obtained."

"3. In view of the extremely long periods after which relapses have occurred, we must be very cautious in stating that an animal is cured. But as several have remained negative without relapse for over 200 days, and subinoculated animals have not become infected, it appears that a certain number of cures have resulted."

"4. Most of the strains used by us, viz., *T. rhodesiense*, *T. brucei*, *T. ugandae*, *T. evansi*, *T. equiperdum*, *T. congolense*, and *T. equinum*, appear to be very susceptible to the drug and trypanosomes disappear from the blood of infected animals within a couple of days of treatment. Our laboratory strains of *T. gambiense* and *T. lewisi* proved to be refractory."

"5. Relapses after the blood had been negative for at least 100 days occurred in animals infected with *T. rhodesiense*, *T. ugandae*, *T. vivax* and *T. equiperdum*."

"6. The drug exerted a definite prophylactic action when injected into guinea-pigs against subsequent infection with *T. rhodesiense*, but none against our laboratory strain of *T. gambiense*. No prophylactic effect was noticed in goats against *T. vivax* nor in donkeys against *T. rhodesiense*."

H. B. Fantham.

Cohn (Julie). **Chemotherapeutische Untersuchungen über die Wirkung von China-Alkaloiden.** [Chemotherapeutic Studies on the Action of the Quinine Alkaloids.]—*Zeitschr. f. Immunitätsforsch. u. Experim. Therapie.* 1913. Vol. 18. July 17. No. 5. pp. 570-590. With 14 text figs.

This paper is a report on the therapeutic action of certain quinine alkaloids in experimental trypanosomiasis. The following conclusions are reached :—

1. If in the treatment of nagana infections one substitutes for quinine the stereoisomeric compound quinidin, no essential reduction in efficacy is noticeable.

2. If the secondary alcohol group of the quinine alkaloid be destroyed, chlorine being substituted for the hydroxyl group, or if the secondary alcohol group is oxidised to ketone, the trypanocidal action of the quinine alkaloid is to some extent diminished but is not however completely lost.

3. If the nitrogen-carbon combination in the loipon portion of the quinine alkaloid be broken up the trypanocidal action is increased ; at the same time, however, the toxicity of the preparation is increased.

W. Y.

YORKE (Warrington) & BLACKLOCK (B.). **Observations on a So-called Cure for Trypanosomiasis.**—*Ann. Trop. Med. & Parasit.* 1914. Apr. 21. Vol. 8. No. 1. pp. 51-53.

The material tried was serum prepared by Mr. H. C. SIEG, who had approached the British South Africa Company with a view to its purchase. The sera were stated to contain no chemical or mineral poisons. "Injection was to be made subcutaneously, and the dose recommended was 1 c.c. for small animals, to be repeated if necessary." Twenty-nine animals were treated, including rats, guinea-pigs and rabbits infected with various strains of pathogenic trypanosomes (e.g. *T. rhodesiense*, *T. gambiense*, *T. brucei*, *T. ugandae*, *T. evansi*). "In no case did recovery take place nor, in fact, was the course of the disease influenced in the slightest degree."

The authors conclude that "The 'sera' supplied . . . . had not the slightest therapeutic value in animals experimentally infected with pathogenic trypanosomes."*

H. B. F.

T. CRUZI INFECTION.

CARINI (A.) & MACIEL (J.). i. **Existence de la Maladie de Chagas dans l'Etat de São Paulo.**—*Bull. Soc. Path. Exot.* 1914. Apr. Vol. 7. No. 4. pp. 289-292.

ii. **Distribution des Triatomes dans l'Etat de São Paulo.**—*Ibid.* pp. 292-295.

i. The authors have searched for the presence of *T. cruzi* in São Paulo, Brazil. They obtained triatomes—larvae, nymphs and adults—from various districts in the State. On arrival at the laboratory the insects were examined for the presence of flagellates, and in the hind gut of those coming from certain districts were found crithidiae and trypanosomes, presenting the same characters as the developmental stages of *T. cruzi*. In order to make certain that the flagellates in question were really *T. cruzi*, laboratory animals were inoculated with the gut contents of the bugs: in the blood of certain of these *T. cruzi* subsequently appeared. The bugs examined and found infected were *T. infestans*, *T. megista* and *T. sordida*.

As a result of this discovery it was decided to examine human beings for cases of infection. The diagnosis is not easy, as trypanosomes are rarely found in the peripheral blood; it is as a rule necessary to inoculate susceptible animals with blood of suspected cases. In the absence of other animals the authors used guinea-pigs, which generally die some time after the inoculation without trypanosomes having appeared in their blood. It is necessary to examine sections of muscle to demonstrate the multiplication forms of the parasite. Amongst the numerous guinea-pigs inoculated from clinically suspicious cases multiplication forms of *T. cruzi* were found in sections of muscle from one. This guinea-pig had been inoculated from a 10 year old child which had lived in a hut badly infested with *T. infestans*. The child was very anaemic and had enlarged lymphatic glands. The guinea-pig died 35 days after inoculation.

* This preparation would appear to be the same as that tested, with similar results, by GROSSULE (see this *Bulletin*, Vol. 3, p. 168).—ED.

ii. The authors have made careful enquiries regarding the distribution of *Triatoma* in São Paulo, and from the information obtained have constructed a map indicating the places where the bugs are known. The State can roughly be divided into two zones, viz. that infested by Triatoma and that free from the bugs. The non-infested zone, forming about a third of the State, consists of a rather large tract of country along the coast. The infested zone is situated in the north east. The population is mostly engaged in the cultivation of coffee and sugar cane. The bugs are usually found in the huts occupied by the poor field workers; the insects obtain suitable shelter in the holes in the walls and straw roofs. Even the better class houses are not entirely free. Whether the Triatoma have existed in the State for a long period and are now disappearing before the advance of civilisation or whether they are of recent importation into the country is a question not without interest. Many trustworthy persons state that it is only during recent years that the bugs have made their appearance on the fazendas. Possibly they have been introduced by immigrants or nomads from neighbouring infested districts. The species found most frequently was *T. infestans*, then *T. megista* and finally *T. sordida*. All three species were found to be infected with *T. cruzi*.

W. Y.

BLACKLOCK (B.). **On the Multiplication and Infectivity of *T. cruzi* in *Cimex lectularius*.**—*Brit. Med. Jl.* 1914. Apr. 25. pp. 912-913.

This paper deals with attempts to transmit *T. cruzi* from infected laboratory animals to healthy animals by means of the common bed bug. The experiments were done at Runcorn with bugs collected from infested houses. Before commencing the experiments 216 of the bugs were examined for flagellates; the result was negative. Mice were used in the first attempts at transmission, but proved unsatisfactory as they very frequently died before the disease had time to develop. Guinea-pigs were then used and gave better results, as they lived for long periods even when the bugs were fed on them frequently. Infected bugs were fed on 28 animals. The number of days elapsing between the infective meal of the bugs and the time they were placed on the healthy animal varied from 2 to 114 days. Faeces were passed freely by the bugs on the shaved skin of the experimental animal in most cases. Only one animal—a guinea-pig—became infected.

That the bugs contained parasites capable of causing infection when inoculated into animals is shown by many observations and experiments. The author found in the alimentary canal of bugs fed on animals infected with *T. cruzi* a very constant appearance of flagellates; a large crithidial form predominated, but varieties resembling blood forms were seen in the rectum of several bugs and intermediate forms were found in large numbers. Of 32 animals inoculated with the alimentary contents of bugs containing flagellates, 9 developed the disease. In 7 mice so infected the average incubation period was 22 days and in 2 guinea-pigs 25 days. Successful results were obtained with animals inoculated with the alimentary canal

contents of bugs which had fed on infected animals so recently as twenty-one hours, and so long as seventy-seven days previously.

The conclusions are :—

"1. *T. cruzi* is capable of living and multiplying in *Cimex lectularius* for long periods.

"2. The parasites found in the bed-bug are infective on inoculation as early as twenty-one hours and as late as seventy-seven days from the infecting feed.

"3. It is not possible to say which of the many different forms occurring in the bug causes infection in the vertebrate host.

"4. Transmission of the disease to healthy animals by feeding infected bugs on them is of very rare occurrence. It was only once observed in the course of these experiments.

"5. There is no evidence of hereditary transmission of *T. cruzi* in *Cimex lectularius*."

[This paper should be compared with that of BRUMPT (see *Sleeping Sickness Bulletin*, Vol. iv, p. 286).]

W. Y.

SERUM DIAGNOSIS OF DOURINE.

WATSON (E. A.). i. **The Serum Reactions and Serum Diagnosis of Dourine.**—*Dept. of Agriculture, Canada. Report of the Veterinary Director General* (F. Torrance, B.A., D.V.S.) *for the Year ending 31st Mar. 1913.* pp. 102-107. Ottawa: Printed by C. H. Parmalee.

ii. **Report on Dourine.**—*Ibid.* pp. 81-86.

i. The author considers the following serum reactions to be of unquestionable value in the diagnosis of dourine :—

1. The complement fixation test.
2. An agglutination test.
3. A precipitation test.
4. The acetic acid test.

The complement fixation test.—To obtain antigen the blood of 5 to 10 or more rats is collected at the height of the infection. The trypanosomes are separated by centrifugation and are washed with normal salt solution. After washing, the trypanosome deposit is added to salt solution in the proportion of 1 to 10 and shaken with glass pearls for two or three days ; the emulsion is then filtered through a Berkefeld filter, the filtrate constituting the antigen. The other reagents for the test are prepared in the ordinary manner.

The agglutination test.—This is much simpler than the previous test requiring, in addition to the serum to be tested, only one reagent—the antigen. This is prepared as described above, but instead of the filtrate the homogeneous emulsion of trypanosomes is used. If there is any spontaneous or auto-agglutination of the trypanosomes in the salt solution, resulting possibly from withdrawing the blood from the rats at too late a stage of the infection, the emulsion should be discarded as useless. It is possible to keep the antigen for a considerable time by storing in ice or by the addition of a small quantity of formaldehyde ; but it is advisable, whenever possible, to use a fresh emulsion. Unless the trypanosome emulsion has just been previously prepared it should be centrifuged, fresh salt solution substituted and the mixture thoroughly shaken to obtain the required homogeneous consistency. About two drops of the emulsion is added to each of a series of 12 tubes,

the first of which contains salt solution and the others dilutions of the serum to be tested varying from 1 in 20 to 1 in 10,000. After shaking the tubes are placed in the thermostat for 1 to 2 hours at 37° C. and the reactions noted at half hour intervals. The reaction may be taken as positive when agglutination occurs in dilutions of 1 in 1,000. Normal and non-specific sera will agglutinate not at all or only in the lesser dilutions of 1 to 20 or 1 to 50, or rarely 1 to 100, whilst dourine sera will agglutinate the trypanosomes in dilutions up to 1 in 4,000 and even 1 in 10,000.

The precipitation test.—Only two reagents are required—serum and antigen. The antigen consists of an absolutely clear extract of try panosomes filtered through a fine Berkefeld filter. To each of a series of tubes ·5 cc. of antigen solution is added and then an equal amount of the different sera to be tested—specific, normal and the unknown or suspected sera. The serum is added to each tube by means of a fine capillary pipette the point of which is passed through the antigen fluid to rest upon the bottom of the tube and the serum then slowly discharged so as to push up the antigen fluid without mixing with it. If the serum contains antibody, a thin white ring will appear at the point of junction of serum and antigen in from 10 to 15 minutes or earlier. The test is still more delicate if three tubes be taken for each serum, to which are added ·5 cc. undiluted serum, ·5 cc. of serum diluted 1 in 5 and ·5 cc. of serum diluted 1 in 10 respectively. In such dilutions the white ring is never shown by any but dourine sera and the reaction is quite specific. Both antigen and serum must be fresh.

The acetic acid test.—This is a purely chemical and quantitative test for the determination of an increased globulin content of blood serum. It is a modification of the test for syphilis devised by Noguchi, who demonstrated in this condition an increase of the globulin content of the blood serum and cerebrospinal fluid; butyric acid was used as a precipitant for globulin. To centrifugal tubes graduated to 10 cc., 1 cc. of serum and 9 cc. of a half saturated solution of ammonium sulphate are added; the tubes are then shaken, allowed to stand for 1 hour and then centrifuged until the globulin is precipitated as a firm mass. The supernatant fluid is then removed and the precipitate dissolved by adding sufficient salt solution to make up to the original volume of 10 cc. In making the test the following quantities of globulin solution are placed in each of 5 small test tubes viz., 1·75 cc., 1·5 cc., 1·25 cc., 1 cc. and 0·75 cc. The volume in each tube is then made up to 2 cc. by the addition of salt solution and finally 1 cc. of 10 per cent. of acetic acid added to each. After shaking the tubes are placed in the incubator at 37°–39° C. for 2 to 3 hours. Dourine sera in a few hours give a very marked cloudiness, which gradually becomes opaque, turbid, flocculent and finally precipitates after 24 hours leaving a clear supernatant fluid. Normal sera give at the most a slight opalescence in Tube 1 and possibly a very faint bluish tinge in Tube 2. The intensity of the reaction is in direct proportion to the amount of globulin present. This is not an absolutely specific test for dourine any more than the butyric acid test is for syphilis. Watson has applied the test in cases of coital exanthema, glanders, influenza, fistulous withers and in a single case of swamp fever; only in the last was a positive reaction obtained. Perhaps the greatest value of the acetic acid test is as a negative reaction excluding dourine infection.

When the acetic acid test is positive, diagnosis should be controlled by one of the other tests.

In conclusion the author writes that the serum reactions of dourine have now become an important factor in the diagnosis and control of the disease in Western Canada and the outlook for stamping out infection is much more promising than it has ever been before. [This paper should be compared with that of MOHLER, EICHHORN and BUCK (see this *Bulletin*, Vol. 3, p. 424).]

ii. The author investigated an outbreak of dourine at Unity, Saskatchewan, which proved to be an unusual type of the disease and is of especial interest as being the first outbreak of dourine in Canada to be investigated by the serological methods of diagnosis. A symptomatic diagnosis was made in January 1912. The infections were mild and easily tolerated, for veterinary inspectors called in a few weeks later were unable to agree on the diagnosis. When the author saw the animals two months later no appreciable advance in the course of the disease was noted. He observed some oedematous infiltrations of the tissues and a suspicious condition of the stallion concerned, but still he was unable to arrive at any definite conclusion as to diagnosis. A search for trypanosomes was negative. Blood was drawn from the stallion and from one of the mares and serological tests undertaken. The serum in each case gave a positive dourine reaction, agglutinating dourine trypanosomes in serum dilutions down to 1 in 2,000, showing also an increased serum-globulin content by the precipitation reaction with the acetic acid test. [For description of these tests see previous paper.] Later the blood of other suspected mares was similarly examined with positive results. Some of the animals died of dourine and the trypanosomes were found in one mare. The earlier symptomatic diagnosis of the disease was therefore supported by serum diagnosis. Detailed directions for taking blood for serum diagnosis are given.

Watson refers to some interesting observations on the transmission of dourine to laboratory animals and on the exalted virulence of the trypanosomes for equines which resulted. During the years 1906 to 1912 many attempts were made to inject laboratory animals (dogs, rabbits, wild mice and gophers). Seventy-seven of the animals were inoculated from infected horses without success. Over 50 white rats were then inoculated with a strain of *T. equiperdum* which after passage through a series of 10 young foals showed a very high degree of virulence for horses, but with scarcely any success for, although several rats were apparently carriers, the blood of one proving infective for a horse, the author was unable to carry on the strain in rats by subinoculation. In November 1912 Watson succeeded in infecting white mice from a mare and after the first passage was made there was not the slightest difficulty in carrying on the strain, which became so virulent that it killed rats in less than three days and mice in 48 hours. Guinea-pigs and rabbits were also successfully inoculated, the former dying in three weeks and the latter in six. Horses inoculated with this strain after it had passed through the rats developed an acute infection, and two dogs which licked the carcass of one of the horses became infected and died in six weeks.

W. Y.

OEHLER (R.). **Untersuchungen über den Dimorphismus von *Trypanosoma brucei*.** [Investigations on the Dimorphism of *T. brucei*.]—*Zeitschr. f. Hyg.u. Infektionskr.* 1914. Apr. 4. Vol. 77. No. 2. pp. 356-370. With 8 text figs.

The author refers to his previous work, in which he showed that by the method of single trypanosome isolation and inoculation it was possible to separate from a double infection two pure trypanosome strains (see this *Bulletin*, Vol. 1, p. 525 and Vol. 2, p. 359). The experiments described in the present paper were done with a strain of *T. brucei* (St. 63) obtained from a naturally infected ox and brought to Europe from East Africa by BRAUN and TEICHMANN (this *Bulletin*, Vol. 3, p. 421). This strain presents a well marked polymorphism, long slender free flagellar forms, short broad aflagellar and intermediate varieties being found. In certain of the short aflagellar forms the nucleus was situated posteriorly.

The author made 40 single trypanosome inoculations from an infected guinea-pig into white mice and on two occasions infection resulted. The incubation period was in each instance 6 days, as compared with the 4 to 6 days after the usual method of inoculation of many parasites. The proportion of successful inoculations (5 per cent.) was very small as compared with that obtained in previous work of the author with the very virulent strain of Togoland nagana (St. 4). In this case 20 per cent. of the single trypanosome inoculations were successful. The author considers this difference to be due to the high degree of virulence of the latter strain as compared with that of the former. Both infections obtained as a result of inoculation of single trypanosomes were exactly as polymorphic as the original strain, and the polymorphism was observed from the first day of the infection. Oehler points out that this result differs somewhat from that obtained by von PROWAZEK with *T. rhodesiense*. VON PROWAZEK found that only the slender forms appeared at first and that the dimorphism was not to be noticed until the third or fourth passage (see this *Bulletin*, Vol. 2, p. 39). It is concluded that the dimorphism of *T. brucei* is not the result of a double infection and, further, that it has nothing to do with a sexual differentiation.

Experiments are described which show that not only passage through different kinds of animal host but also passage through animals of the same kind will lead to the purification of a mixed infection. A salvarsan resistant race and a normal race of nagana (St. 4) were mixed and inoculated from mouse to mouse. The two components of this mixed infection could readily be recognised *in vitro* by adding to the blood of the mouse a solution of salvarsan; the normal race of trypanosomes was at once immobilised by the drug, whilst the resistant race continued actively mobile. After many passages through mice the salvarsan resistant trypanosomes became fewer and fewer, until by this test only susceptible trypanosomes could be found. The test is however coarse, as it fails to recognise a slight admixture of the resistant race. The presence of such a race is, however, at once demonstrated by treating the mouse with 1 mgm. of salvarsan. The trypanosomes disappear from its blood for a day but soon return. The test *in vitro* now shows all forms to be resistant—the preponderating susceptible race had been destroyed by the drug. After still

further passages, however, the resistant race disappears and only susceptible trypanosomes are found. In order to reduce a mixed infection consisting of a minimum content of susceptible trypanosomes and a maximum content of resistant trypanosomes to an infection containing the two races in equal amounts, about 10 passages were required; about 40 passages were found necessary to cause the disappearance of the salvarsan resistant trypanosomes as demonstrated by the *in vitro* reaction, and about 55 passages to produce complete disappearance of the resistant race as demonstrated by the reaction *in vivo*.

The author considers the question whether the dimorphism of *T. brucei* has anything to do with sexual differentiation. The broad forms have been held to be female and the slender forms male varieties. As both forms occur regularly in the infections resulting from single trypanosome inoculations, this explanation of dimorphism cannot be correct. Oehler considers that the slender forms are growth forms (*Wucherungsform*) and the broad forms "Remission" forms. He points out that the expression dimorphism refers really to the extreme types of trypanosome met with in such species as *T. brucei*, *T. gambiense* and *T. rhodesiense*, but that in addition all stages of intermediate forms are met with.

Regarding the change of forms met with in the course of infection in mice with the dimorphic nagana strain, the author states that the broad forms herald a remission. The first trypanosomes which appear after the remission are similar to those which first appear after inoculation—"broad intermediate" varieties or the "moderately broad" forms; then the trypanosomes become more numerous and more slender until at the height of the exacerbation the slender forms vastly preponderate.

The broad varieties are hence remission forms and the slender varieties exacerbation forms.

W. Y.

DELANOË (P.). **Des Variations du Pouvoir Infectieux et de la Virulence de *Trypan. dimorphon* L. et M. (Deuxième Note.)**—*Bull. Soc. Path. Exot.* 1914. Apr. Vol. 7. No. 4. pp. 281-289. With 1 text fig.

This paper describes the manner in which a strain of *T. dimorphon*, which at the time of its isolation from a naturally infected ox was absolutely non-inoculable into the white rat and guinea-pig, has been made virulent for these animals. This paper is a continuation of previous work on this subject by the author (see this *Bulletin*, Vol 3, p. 253).

The various subinoculations made are described in detail and are summarised in a table at the end of the paper. From the naturally infected ox a white rat and a kid were inoculated; the kid became infected with a double infection of *T. dimorphon* and *T. cazalboui*—the rat remained healthy. From the kid a series of animals (3 white rats, 4 grey rats, 1 guinea-pig, 1 rabbit, 1 *Golunda campanae*, 2 *Xerus erythropus* (squirrel), a pig and 2 dogs) were inoculated with only one positive result: one of the dogs developed a slight infection of *T. dimorphon*. From this dog three rats and a goat were inoculated, and all but one rat became infected. The strain was carried on in

guinea-pigs and rats by subinoculation from the goat and from one of the rats and the subinoculations were successful.

The conclusion is that it is sometimes difficult to demonstrate the susceptibility of the white rat and guinea-pig to *T. dimorphon* and that it must only be concluded that a trypanosome is not pathogenic for a species of animal after repeated and sufficient trial. [This conclusion is similar to that reached by BLACKLOCK and YORKE (see this *Bulletin*, Vol. 3, p. 169).]

W. Y.

HAGEMEISTER (Wolfgang). **Ueber die Züchtung pathogener Trypanosomen auf künstlichen Nährböden.** [On the Cultivation of Pathogenic Trypanosomes in Artificial Media.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1914. Apr. 1. Vol. 77. No. 2. pp. 227-256.

A brief summary is given of the literature dealing with attempts to cultivate pathogenic and non-pathogenic trypanosomes in artificial media.

In his later experiments Hagemeister used the Novy-MacNeal medium which has the following composition :—

Extract of 125 gm. of ox or horse flesh in 1,000 cc. of Aq. dest.
20 gm. of agar.
20 gm. of peptone.
5 gm. of Nacl.
10 cc. of normal soda solution.

As the degree of acidity of the extract of meat solution is very variable the author decided, instead of adding 10 cc. of normal sodium carbonate solution, to render the medium neutral to litmus and then add 5 cc. of normal sodium carbonate solution in excess.

To the medium prepared in this manner 2 per cent. of dextrose was added as recommended by BASS, ZIEMANN and others for the cultivation of malaria parasites and *Piroplasma canis*. In each test tube, containing 3 to 4 cc. of the medium, was added twice or thrice the volume of sterile defibrinated blood. Details are given of the technique employed to obtain sterile defibrinated blood. In order to prevent evaporation of the water of condensation paraffin was found to be preferable to rubber caps, wax and sealing wax.

The trypanosomes used by the author in his experiments were *T. brucei* (strain Ferox) and the East-Prussian strain of Beschälseuche, *T. equiperdum*. The blood was collected in capillary tubes with sterile precautions from the beating heart of heavily infected rats and mice. It was mixed with an equal quantity of physiological salt solution and two or three drops of the diluted blood were added to the nutrient medium. In this way bacterial-free cultures were obtained. The tubes were kept in the dark at room temperature.

The author gives the following summary of his results :—

Cattle trypanosomes of the type of *T. theileri* multiply only for the first generation in cattle blood media at 37° C. On the other hand subcultures of this species of trypanosomes were successful on the Novy medium prepared with goat blood.

Dextrose exerts a beneficial influence on the vitality and the capacity for multiplication of pathogenic trypanosomes *in vitro*.

On the addition of dextrose, it was found that not only do other kinds of blood (goats, horse, donkey and calf) replace the costly rabbit blood but

they even surpass it. In rabbit blood media dextrose is without beneficial influence.

On dextrose media pathogenic trypanosomes preserve their infectivity but their virulence diminishes.

Several passages through artificial media do not make pathogenic trypanosomes more suitable for culture *in vitro* but decrease their vitality and quickly diminish their virulence.

T. brucei preserves its virulence in cultures better and more regularly than *T. equiperdum*.

W. Y.

BROWN (Wade H.). **A Note on the Pathogenicity of *Trypanosoma lewisi*.**—*Jl. Experim. Med.* 1914. Apr. 1. Vol. 19. No. 4. pp. 406-410.

The author reviews the previous evidence concerning the pathogenicity of *Trypanosoma lewisi*, and concludes that pathogenic strains of the parasite exist and that "possibly all strains possess potential pathogenic properties." He, personally, worked with a strain of *T. lewisi* "that, for a short time, showed an unusual increase in its virulence." The trypanosome was isolated from "a natural infection in a wild rat and has been carried for several years in white rats with no unusual manifestations of virulence. In October, 1913, for three successive generations, fatal infections resulted from the intraperitoneal injection of one to two drops of tail blood, diluted with 1 cc. of a 1 per cent. sodium citrate solution, death taking place 8 to 11 days after inoculation. Five rats out of the six inoculated succumbed to this infection."

A large rat infected with this strain of *T. lewisi* was bled to death and 10 normal rats were inoculated intraperitoneally with its blood. Of these, one rat died in 48 hours, and the autopsy showed a marked bronchiectasis, while another showed only a transient trypanosome infection. The remaining eight rats showed a rapid increase of the trypanosomes, and the infection terminated fatally between the sixth and ninth days. "The rats became torpid and weak, with marked anaemia and dyspnoea, and slight loss of weight. A few rats showed bloody nasal and lachrymal discharges, and all of them developed a diarrhœa with greater or less abdominal distension." Autopsies on these rats showed marked splenic enlargement and hyperplasia of the bone-marrow, and a few foci of necrosis in the liver.

When the above strain became slightly less virulent it was compared with another strain of *T. lewisi* recently isolated, by inoculating five rats with each strain. None of them died, but the first strain was the more virulent.

The author concludes that:—

"1. Some strains of *Trypanosoma lewisi* may, at times, produce rapidly fatal infections in a large percentage of the rats infected.

"2. In such strains of *Trypanosoma lewisi*, a sufficient degree of pathogenicity may persist to warrant the designation of these strains as pathogenic.

"3. The pathogenicity of a given strain of *Trypanosoma lewisi* is not constant, but is subject to marked and even sudden variations."

H. B. F.

KALA AZAR.

WENYON (C. M.). **Kala Azar in Malta, with some Remarks on the Various Leishmaniases.**—*Trans. Soc. Trop. Med. & Hyg.* 1914. Jan. Vol. 7. No. 3. pp. 97-111. With 1 plate.

Kala azar was first shown to exist in Malta by CRITIEN (1910), who pointed out that the disease in children had long been known under the name of "*marda tal biccia.*" He also discovered that the dogs in the island were liable to leishmaniasis. The author confirmed CRITIEN's findings, seeing during his stay in Malta seven cases of the disease in children.

The question of the identity of Indian and Mediterranean kala azar is discussed. The natural freedom of dogs in India from the disease, Wenyon believes, may probably be due to the fact that the transmitting host is not the same as that in the Mediterranean and is one which is not in the habit of feeding on dogs. Whether this be so or not, it is now known that dogs can be infected experimentally with virus both from Indian and Mediterranean cases. If due regard is paid to the symptomatology and distribution of the disease, the morphology of the parasite and infection of animals, it can hardly be onger maintained that kala azar as it exists in India is a disease ldifferent from that in China, Europe, Africa and even South America.

Dealing with the question of etiology the author states that a great deal of doubt as to the mode of transmission of the parasite still exists. In Europe BASILE claims to have transmitted the disease to dogs by means of fleas collected from infected dogs and from the houses of kala azar cases. It is pointed out that these experiments were remarkable in that they were invariably followed by positive results, a most unusual occurrence in connection with such experimental work. Further there is a fallacy in experiments of this kind, for the dogs employed were those of a country in which the natural canine disease exists. The author accordingly had four young dogs sent out from England. Immediately upon their arrival, two of them were enclosed in a mosquito-proof cage and two in an unprotected cage about 15 yards distant. Over 300 fleas transferred from an infected dog were allowed to bite the animals in the protected cage. These finally died, but at the autopsy there was no suggestion that they had been suffering from kala azar. A careful examination of smears of the liver, spleen and bone marrow failed to reveal any leishmania, nor did any flagellates develop in tubes of NNN medium inoculated from these organs. The control dogs in the neighbouring cage remained perfectly healthy. This experiment therefore lends no support to the flea transmission hypothesis. The author suggests that the transmitting host in Malta is most probably a biting arthropod. The fact that parasites may escape from the body by way of the gut is mentioned and it is suggested that investigation might be made on these lines by feeding monkeys and dogs on infected organs. Outside the body the leishmania are not very resistant.

In diagnosing kala azar and oriental sore it may be difficult to find the parasites on microscopic examination. In Wenyon's experience with experimental animals the inoculation of tubes of NNN medium from the organs has given rise to a culture of flagellates, when micro-

scopic examination of the same organs has been negative. (See also p. 550).

The author believes that kala azar, whether in children or adults, in all parts of the world is caused by the parasite *Leishmania donovani*, while oriental sore is caused by *Leishmania tropica* in the old world and probably also in South America, though this cannot be regarded as finally settled.

G. C. Low.

Lignos (Antoine). i. **De l'Epoque de l'Apparition du Kala Azar à Hydra.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 45-46.

ii. **Troisième Cas de Guérison de Kala Azar infantile observé à Hydra.**—*Ibid.* pp. 43-45.

iii. **La Mortalité par Kala Azar à Hydra pendant l'Année 1911.**—*Ibid.* Mar. No. 3. p. 193.

i. Of 37 cases of infantile kala azar occurring in Hydra during the four years 1910–1913 the great majority showed their first sign of infection during the cold weather (October to March), with a maximum in the month of February.

ii. In a former paper the author recorded one case of recovery from kala azar of 13 cases seen in Hydra during 1911, eleven of whom had died and one other was still living. This case has now completely recovered. The author concludes that (1) Recovery from infantile kala azar is not rare, since of six cases seen in 1910 one recovered and of 13 seen in 1911 two have recovered; (2) Dark pigmentation of the skin is not an uncommon feature of the disease, for it has been shown by two of the 19 cases seen in 1910 and 1911.

iii. During the year 1911 among children under 6 years there were 36 deaths. Of these 14 were shown by microscopic examination to have died of kala azar. Thus 39 per cent. of the infantile mortality is due to this disease. The total population of the island is 6,000. In order to check this high mortality rate, the author advocates the extermination of all the dogs of the island.

C. M. Wenyon.

Pittaluga (Gustavo).—**Kala-Azar infantile e Leishmaniosi canina in Ispagna.**—*Pathologica.* 1914. Mar. 1. Vol. 6. No. 128. pp. 121-123.

The author points out that since his discovery of the infantile form of kala azar at Tortosa near the mouth of the river Ebro on the east coast of Spain (see this *Bulletin*, vol. 2, p. 443) other cases have been recorded at various places along the southern and eastern coasts. He now records further investigations on the subject. In conjunction with Garcia del Diestro he has obtained culture of the parasite in the usual way in NNN medium. As a result of the examination of dogs in the neighbourhood of Tortosa two have been found suffering from kala azar. A third infected dog has been noted from Beninar in the province of Almeria. Cultures have been made of the canine parasites.

C. M. W.

CONOR (A.) & CALÔ (E.). **Le Troisième Cas de Kala-Azar d'Origine algérienne.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 42-43.

In this paper there is placed on record a case of kala azar in a child aged three years, the third case of the disease to be discovered in Algeria.

C. M. W.

CANNATA (S.). **Ulteriori Ricerche sulla Presenza del Parassita di Leishman nel Sangue periferico di Bambini affetti da Leishmaniosi.**—*Pediatria.* 1914. Jan. Vol. 22. No. 1. pp. 27-32. With 1 plate.

In previous papers (see this *Bulletin*, Vol. 2, p. 436) the author reported his discovery of leishmania in the peripheral blood of cases of Mediterranean kala azar and showed that parasites could be found in ordinary blood films, provided care was taken to examine patiently many films from each case. In this paper the author tells us he has continued his examinations with a result that he has demonstrated parasites in the peripheral blood of 15 out of 16 cases of the disease in children. Attempts at cultivating parasites from the peripheral blood of five cases on NNN medium failed. The parasites, as they occur in the mononuclear or polynuclear cells or free in the plasma owing to rupture of the cells in film making, are shown in four excellent microphotographs.

C. M. W.

WHIPHAM (T. R.). **Case of Kala-Azar.**—*Proc. Roy. Soc. Med.* 1914. Feb. Vol. 7. No. 4. Section for the Study of Disease in Children, pp. 63-64.

This case is chiefly of interest in that it illustrates that the Indian form of the disease occurs in children, a feature which appears to be more characteristic of the Mediterranean type. The patient was a boy aged five years who first became ill in Calcutta in March, 1913. The father of the boy contracted the same disease in Calcutta a year ago and has since died. Both cases were diagnosed by the finding of *Leishmania donovani* on liver puncture. When the boy was shown at the Society he had improved in health for some weeks. [It is known to the reviewer that the child subsequently died.]

C. M. W.

GABBI (U.). **Il Kala-Azar Indiano e Mediterraneo sono Identici. Nuove Indagini Sperimentali.**—*Malaria e Malat. d. Paesi Caldi.* 1914. Jan.-Feb. Vol. 5. No. 1. pp 14-22: and *Pathologica*, 1914. Feb. 1. Vol. 6. No. 126. pp. 69-74.

In this paper the author shows how the various arguments which have been employed to establish the non-identity of Indian and Mediterranean kala azar have gradually been disproved. He refers to the experiments of DONOVAN and PATTON, who succeeded in infecting Indian dogs by injecting large doses of *Leishmania donovani*. In order to test whether Indian dogs were also inoculable with the

virus of Mediterranean kala azar, the author has obtained three dogs from Bombay which were sent to him in Italy.

Experiment 1. Dog 3,800 grams in weight on July 3rd was injected intraperitoneally with 3 cc. of spleen juice from a child suffering from kala azar. The dog remained in good health and gained in weight to 4,900 grams. On September 15th it was reinoculated in the liver with 3 cc. of spleen juice containing numerous leishmania. The dog was killed on November 24th when it weighed 5,200 grams. Parasites were found in small numbers in one smear of the liver and in four of the bone marrow. Six tubes of NNN medium inoculated from the liver, spleen and marrow were negative.

Experiment 2. Dog 5,600 grams in weight on July 5th was injected intraperitoneally with 2·5 cc. of spleen juice. On November 17th, when the dog had increased in weight to 6,700 grams, it was reinoculated subcutaneously with 2 cc. of spleen juice containing numerous leishmania. The dog was killed on December 7th. No leishmania were found in any organ and cultures from the spleen, liver and marrow were negative.

Experiment 3. Dog 7,500 grams in weight was inoculated on July 6th intraperitoneally with 2·5 cc. of spleen juice rich in leishmania. On November 25th it was reinoculated subcutaneously with 2·5 cc. of spleen juice and again on November 28th intraperitoneally with 3 cc. The dog was killed on December 16th. Numerous leishmania were found in the smears of the spleen and marrow but none in the liver. Cultures from the spleen, liver and marrow curiously enough were negative.

It has thus been demonstrated that the dogs of India are susceptible to the virus of Mediterranean kala azar to just the same extent as they are to the virus of Indian kala azar as demonstrated by the experiments of Donovan and Patton, so that there is no longer any reason to regard the two forms of disease as distinct.

C. M. W.

Laveran (A.). **Nouveaux Faits tendant à démontrer que le Kala-Azar Méditerranéen doit être identifié au Kala-Azar Indien.**—*Compt. Rend. Acad. Sciences.* 1914. Apr. 14. Vol. 158. No. 15. pp. 1060-1064.

In this paper the author reviews his experiments on monkeys, dogs and mice with the virus of Mediterranean and Indian kala azar.

Monkeys. Twelve monkeys (*M. sinicus* and *M. cynomolgus*) were inoculated with Mediterranean virus. Of these two had a general infection which proved fatal, six had mild infections and four remained uninfected. The percentage of infections was 66·6 per cent. Eight monkeys were inoculated with Indian virus and of these six contracted the disease, a percentage of 75.

Dogs. Thirty-three dogs were inoculated with Mediterranean virus and 28 became infected. The percentage was 84·8. Of ten dogs inoculated with Indian virus seven were infected, a percentage of 70.

Mice. Twenty-six mice were inoculated with Mediterranean virus. In 21 of these there resulted a general infection. Three mice inoculated with Indian virus all had a general infection.

One monkey (*M. cynomolgus*) was inoculated with Mediterranean virus on April 24th, 1909. Splenectomy was done on October 30th, 1909. The spleen was infected with leishmania. On August 23rd (1910 ?) the monkey was in good condition and was reinoculated with a large dose of Mediterranean virus. This had no result. On November 8th, 1913, it was inoculated with Indian virus at the same

time as another monkey (*M. cynomolgus*). The previously inoculated monkey did not become infected, whereas the control became infected and died. Post mortem its organs contained large numbers of leishmania.

These experimental results all speak in favour of the identity of Indian and Mediterranean kala azar.

C. M. W.

DA SILVA (Pereira). **Notes sur le Kala-Azar.**—*Arquivos do Inst. Bacteriol. Camara Pestana.* 1913. Vol. 4. No. 2. pp. 147-172. With 2 coloured plates and 3 text figs.

The first case of kala azar in Portugal was in a child aged 9 years from Lisbon. The case was supposed to be one of tuberculosis of the spleen and laparotomy was performed. When no tubercular lesions were discovered it was decided to remove the spleen, and in smears of the removed organ Dionysio ALVAREZ (March, 1910) discovered leishmania. Since that date nine other cases, all in young children, have been brought to light. They have all been inhabitants of Lisbon or places within a radius of 28 kilometres of Lisbon.

An extensive examination of the dogs of Lisbon was undertaken with a result that of 416 dogs examined from various parts of the town 13 were found to have canine kala azar. The diagnosis in every case was made by the finding of leishmania in smears (spleen, bone-marrow and liver).

Inoculation Experiments. From the spleen of a case of kala azar a dog was inoculated intrahepatically with 2 cc. of emulsion. The dog became infected as demonstrated by liver punctures. Eventually parasites were no longer found on liver puncture and, as the dog appeared perfectly well, it was killed eight months after inoculation, when scanty parasites were found in the spleen and marrow only.

Six dogs were inoculated either intrahepatically or intraperitoneally or both ways from the spleens of dogs suffering from natural canine kala azar. Four of these received a second inoculation of the same kind some months later, and of these four three were found infected when killed. Of the two dogs which received but one injection one was infected.

Three other dogs were subinoculated from the spleens of some of the dogs which had been successfully infected. All three became infected and in one of these the disease was very rapid and ended fatally in two months. This dog had a most intense infection, parasites being found in the spleen, liver, bone marrow, mesenteric glands, lungs and kidneys. In the spleen and marrow the parasites were present in extraordinary abundance.

As a result of these experiments the author finds that the disease of children and that of dogs are both inoculable to dogs and that other dogs may be infected by subinoculations. In dogs the spleen and marrow are most intensely infected, and a safe diagnosis can only be made in dogs by examination of one of these, by laparotomy for the spleen or bone puncture for the marrow. Liver puncture has been most unreliable as a means of diagnosis. As regards the symptoms in the infected dogs the author finds that there are generally none and that there is no loss of appetite, while the animals usually put on flesh.

They are happy and show no nervous or motor troubles nor depression of the body temperature. Two of the dogs, which were only one month old when inoculated and had a very intense infection, showed nothing of the hypothermia, loss of appetite, wasting, tremors, motor troubles or diarrhoea supposed by BASILE to characterise the acute infection of young dogs. When such symptoms as loss of hair, wasting, thickening, wrinkling and scabbing of the skin, and motor troubles of the hind limbs appear, they are due undoubtedly to mange and not to the infection with leishmania. In the case of the dog referred to above as having had an acute infection with enormous numbers of parasites in the organs the only symptoms were wasting and a purulent condition of the eyes. The appetite remained quite good. Of all the dogs infected only two could be said to have died of the disease. Others died as a result of the skin disease due to *Demodex folliculorum*. Cultures and subcultures of the leishmania from these various dogs were readily obtained on NNN medium.

Transmission experiments. Eighty fleas (*Ctenocephalus canis*), caught on two of the experimentally infected dogs, were examined for flagellates and three were found infected with round forms very like the parasites in the spleen and marrow smears of infected dogs. Some of the longer forms had short flagella. No further dissections of fleas from these dogs were made as the author wished to use the fleas for transmission experiments. For examination of the faeces of the fleas he used a small flattened glass vessel the mouth of which could be covered completely by an ordinary microscope slide. Round the vessel's mouth was a band of metal which was continued beyond the vessel on each side so that, when this continued portion was turned over, it formed a slot into which the glass microscope slide could be slipped and held in place against the mouth of the vessel. The flea to be examined is dropped into the vessel, the slide is slipped in and the vessel inverted so that the flea is compelled to rest on the slide. When faeces have been deposited on the slide the vessel is again turned up and the flea falls to the bottom and cannot escape while the slide is removed. The faeces after mixing with a little saline are spread, dried and stained.

The author gives a description of the various forms of flagellate found and illustrates them by a coloured plate. They differ very little, if at all, from the forms found in cultures of leishmania. Having found three fleas from kala azar dogs infected with flagellates, while none of 60 fleas from healthy dogs were infected, the author originally concluded that the flagellates must have developed from the leishmania of the dog. It is now however known that fleas may be infected apart from kala azar in dogs, so that the author admits that he cannot any longer hold that the flagellates in the fleas are such as he originally supposed them to be. On the other hand he cannot state that they are not such. With these fleas he has undertaken transmission experiments.

Experiment 1. A dog which was born on March 18th, 1911, was subjected to laparotomy on April 18th. Its spleen was exposed but not removed and preparations made from the spleen pulp. It was not infected with leishmania and recovered from the operation. On April 27th it was enclosed with two dogs which had been just inoculated from another dog. Both these dogs were found infected by marrow puncture on May 25th. The three dogs continued to live together and fleas caught off the two

infected dogs were placed on the healthy dog. On June 8th 71 fleas were transferred. Between June 14th and June 22nd 115 fleas in six batches were transferred. The faeces of each batch were examined by the glass jar method and three batches were found infected with flagellates. On July 1st and 31st and August 31st the marrow of the femur of the dog was examined with negative result. The animal died of mange in December and leishmania were not present in any of the organs. This dog, a very young one, had thus lived for four months in contact with two heavily infected dogs and 185 fleas were actually transferred (in addition to fleas which were passing from one to the other naturally) without the dog contracting the disease.

Experiment 2. A dog aged one month was found by marrow puncture to be free from leishmania. On July 20th the dog was injected subcutaneously with two lots of flagellate infected faeces from fleas taken off infected dogs. Two other injections of the same kind were given on July 26th and again on August 1st and 4th. On August 30th bone marrow examination was negative. The dog was killed in October and no leishmania were found.

Experiment 3. In July, 1912, 101 *Ctenocephalus canis* were taken off a dog which was not infected with leishmania, and in 4 of these there were flagellates indistinguishable from those previously found in fleas off kala azar dogs.

As this demonstrated that flea dissections alone could give no result, the author determined to control his fleas by fixing them on wires by NÖLLER'S method.

A. 45 fleas (*Pulex irritans*) were fixed on wire and were fed for fifteen days on a healthy dog. The faeces were free from flagellates. They were then fed during one and a half months on a heavily infected dog and the faeces were constantly examined. Some of the fleas died during the experiment and owing to negligence of the laboratory assistant all the surviving 25 died at the end of the one and a half months. They had been kept at laboratory temperature but never had acquired any flagellate infection.

B. 22 fleas (8 *P. irritans*, 14 *C. canis*) were fed on a healthy dog for 15 days without any infection being found by faeces examination. They were then fed on an infected dog and after 8 days three of the *C. canis* had flagellates in their faeces. The fleas were then fed regularly on a young uninfected dog. When they died or were dying the fleas were dissected and the three mentioned above were found still infected with flagellates. The flagellates were taken up in saline solution and inoculated into the liver of a healthy dog. This dog died one month later. Examination of the spleen and marrow by smears and culture on NNN medium was negative. The dog on which the flagellate infected fleas had fed also remained uninfected.

C. From the dog mentioned above as having a very severe infection another dog was inoculated and on it two weeks later 33 fleas (16 *P. irritans* and 17 *C. canis*) commenced to feed. Five days later one of the *C. canis* had flagellates in the faeces. This flea had not had its faeces tested before feeding. It was found however that the dog had not become infected, though it had been inoculated from the very heavily infected dog, so there was no question of this flea having acquired its flagellates from the dog. The flagellates of this flea were inoculated into a young dog. Into the same dog were inoculated flagellates found in fleas (*P. irritans*) taken off a case of kala azar in a child. The dog was kept under observation for four months and the marrow by smear and culture was always negative.

D. 20 *Pulex irritans* were caught off healthy individuals. In the faeces of one flagellates occurred. The flea was fed on a young dog for 28 days after which it died. The dog was then made to eat the flea. The dog acquired no infection.

In these experiments with fleas, apart from the three fleas (*C. canis*) under heading B, there is no question of any of them having become infected from the leishmania of the dogs. The three fleas which later

showed flagellates (see B above) may have themselves had previously a very small undetected infection. If the flagellates which appeared were leishmania, then the dog into which they were injected should have become infected.

[These experiments, which appear to have been laboriously conducted with every care and control, do not lend any support to the numerous successful flea transmission experiments carried out on dogs by BASILE in Italy.]

C. M. W.

SALVATORE (Domenico). **Colture di Leishmania hominis iniettate nel Peritoneo dei Cani.**—*Malaria e Malat. d. Paesi Caldi.* 1914. Jan.-Feb. Vol. 5. No. 1. pp. 29-32.

The author records an attempt made by him to infect ten young dogs by the intraperitoneal injection of young cultures of leishmania from a case of Mediterranean kala azar. Four of the dogs died on the second, sixth, seventeenth and forty-fifth days respectively. The six remaining were killed after eighty or ninety days. All were examined after death for evidence of infection, but the result was invariably negative. Cultures were made from the liver, spleen and bone marrow but no flagellates developed. It is evident that the dogs did not become infected.

C. M. W.

WENYON (C. M.). **The Culture of Leishmania from the Finger-Blood of a Case of Indian Kala-Azar, with some Remarks on the Nature of Certain Granular Bodies recently described from this Disease.**—*Jl. Trop. Med. & Hyg.* 1914. Feb. 16. Vol. 17. No. 4. pp. 49-51.

The author confirms MAYER and WERNER'S work on the possibility of obtaining cultures of leishmania from the peripheral blood in cases of Indian kala azar (see this *Bulletin*, Vol. 3, p. 136). Six tubes of NNN medium were inoculated with two or three drops of finger blood obtained from a case of kala azar in whom repeated examinations had failed to reveal parasites in the peripheral blood. The diagnosis however had been confirmed by the demonstration of parasites in the blood obtained by liver puncture. The tubes were incubated at a temperature of 23°–25° C. and were examined from time to time. On the sixth and eleventh days no growth of flagellates was noted. On the eighteenth day five of the tubes were free from bacteria and flagellates were present in these in such numbers as to be easily seen with low powers of the microscope.

Similarly a case of tropical sore, which showed no parasites microscopically, gave positive results by cultivation methods. The author believes that this development and multiplication of leishmania in the test tube demonstrates the possibility of the true invertebrate host becoming infected from the peripheral blood. He further points out the value of the method as a means of diagnosing any leishmanial disease, especially kala azar, where spleen or liver puncture cannot be undertaken and where nothing is found in the peripheral blood. The mode of preparation of the NNN medium is as follows :—

14 grammes of agar, 6 grammes of salt and 900 cc. of distilled water are dissolved in the usual manner and distributed without filtering in test

tubes (1 inch in each tube). The tubes are then plugged and sterilized in the autoclave. A rabbit is next killed with chloroform and laid out on its back, the thorax being painted with a solution of iodine. The heart is then exposed with sterile instruments and a sterile 20 cc. syringe with a large needle is plunged into it and the blood drawn up.

The agar tubes, which have been cooled to below 50° C. and in which the agar is still liquid, are held and opened by an assistant and into each about 1 cc. of blood is introduced. The tubes are then rolled in the hand to mix the still liquid agar and blood and subsequently are sloped. When solid they are incubated at 37° C. for 24 hours to determine their sterility. Inoculation is made into the water of condensation which is collected in the tubes and after this has been done they are incubated at a temperature of 22°–25° C., evaporation being prevented by covering them with a rubber cap. In order to watch the progress of the growth of leishmania parasites in them, all that is necessary is to remove a small quantity of the liquid on a platinum loop, place it on a slide and examine it with a $\frac{2}{3}$ or $\frac{1}{4}$ inch objective with the condenser down; the flagellates can then be easily seen. Care must be taken to prevent bacteria gaining access to the tubes, as they will kill the parasites.

Recent work by ARCHIBALD in the Sudan and by STATHAM and BUTLER on the West Coast of Africa is commented on (this *Bulletin*. Vol. 2. p. 119 and Vol. 3. p. 137). The first of these observers discovered in the spleen and liver of kala azar cases blue-staining protoplasmic masses containing purple staining granules in varying numbers, but no leishmania; the latter have described similar bodies from the liver of a case of splenic enlargement in West Africa and suggest that they possibly represent the schizogonic stage of some protozoon. Similar bodies have been described by SMALLMAN from the liver of cases of Mediterranean kala azar. The author believes that these observers have produced no evidence whatsoever to prove that the granules seen by them are parasitic. He points out that because protozoa consist of protoplasm and chromatin it must not be forgotten that the cells of the higher animals consist of the same two substances, and in smears stained with Romanowsky's stain the cytoplasm, whether a protozoon or the cell of a higher animal, tends to stain blue while the chromatin and other granules stain varying shades of red and purple, for protoplasm is essentially the same wherever it occurs. Lately, while working experimentally with leishmaniasis in animals, Wenyon has encountered in liver smears the bodies described by the authors mentioned above. Sometimes these were exact reproductions of ARCHIBALD's bodies; at other times they could not be distinguished from those figured in the papers of STATHAM and BUTLER, and SMALLMAN. Examination of the livers of uninoculated dogs and rats, however, showed that exactly the same bodies might occur, so this did away with any possibility of their being connected with leishmania. After a careful examination of many films the author is convinced that the bodies in question are merely detached portions of the cytoplasm of large cells which are themselves charged with granules. The exact staining of these varies very much, and depends largely on the extent of disintegration of the cells and the amount of flattening to which they have been submitted in the process of film making.

G. C. L.

PRICE (J. Dodds) & ROGERS (Leonard). **The Uniform Success of Segregation Measures in Eradicating Kala-Azar from Assam Tea Gardens. Its Bearing on the Probable Mode of Infection.**—*Brit. Med. Jl.* 1914. Feb. 7. pp. 285-289.

During 1906–7 the epidemiology of kala azar in the tea gardens of the Nowgong district of Assam was investigated by the authors. Previous to this Dodds Price had realised that the coolie lines were being gradually infected from the villages, and as early as 1895 built new coolie lines for a number of freshly imported coolies arriving on the Rangamati tea estate. Rogers commenced his investigations in 1896 and independently arrived at conclusions similar to those held by Dodds Price. In 1897 the authors investigated together the result of the new lines on the Rangamati estate. It was found that no case of kala azar had occurred among 150 coolies who had resided there for 2 years, yet of 50 coolies of the same batch who had for want of room been compelled to live in the old lines no fewer than 16 per cent. were already dead of kala azar, while others were suffering from the disease and that in spite of the fact that the new lines were only 300 yards distant. A further experiment was, therefore, carried out at the Old Solona out-garden lines of the Rangamati estate. It was decided to remove only those who had no cases of disease in their families. Of 240 it was only possible to remove 96 to the new lines and of these five were sent back owing to developing fever. The new lines were further filled up with freshly imported coolies to the number of 800 persons, all of whom to this day—that is for sixteen years—have remained free from kala azar. Of those left behind in the old lines [the authors state 96 but they evidently mean the 144 left behind plus the 5 that had to be sent back] all died during the next few years. Kala azar, moreover, spread to a contiguous line with 60 healthy coolies, who had worked for years on the estate and refused to move into the new lines. One third of these died during the next fifteen months, and the rest all succumbed or left the estate during the few succeeding years. The new lines, which have remained free for 16 years, are only 400 yards away from the old ones.

The success of these early experiments encouraged the tea garden managers to allow Dodds Price to repeat the procedure in connection with coolie lines infected with kala azar. The authors have recently studied the result of these undertakings and, as they have been uniformly successful, they prove the soundness of the measure and render it one of the first importance in dealing with this disease. The general results are given in a Table and this, with the authors' remarks concerning it, is reproduced.

"In order to bring out the facts in as condensed and convenient a form as possible, the most essential data, as far as they are available, regarding the infected Nowgong tea gardens are shown in Table 1. Column 1 shows the working population of each line at the present time, to which must be added from 20 to 25 per cent. to allow for young children. Then follow the dates on which the lines became infected with kala azar; the approximate number of deaths before the lines were moved, the figures being on the conservative side, and to some extent under-estimating the real loss; succeeding columns give the years in which the new lines were built, which was almost always in the non-manufacturing cold season; the approximate number of persons with infection in their households, who were left on the old site or in a segregation camp, and the number of deaths from kala azar which subsequently occurred among them. The

distance of the new lines from the old infected ones and the number of years which the new lines have now remained free from the disease complete the table. As there have been no material extensions of the area under tea in the Nowgong district during the period of time dealt with, owing to the difficulty in increasing the labour force, the present working population of the coolie lines is much the same as formerly. It thus appears that in the ten lines shown in Table 1 kala azar has been stamped out of a labour force of nearly 7,000 workers, after it had caused a mortality within a few years of 207 per mille, and although, subsequently to moving the coolie lines, over half of the infected households which had to be left behind on the infected sites died of the disease. As it costs from £7 to £14 to recruit a coolie, and the average duration of the illness is at least seven months, during which food and treatment costs £4, it is clear that, in addition to the great saving of life and suffering, the financial aspect of the case to the tea industry is of great importance."

TABLE 1.

Tea Estate.	Working population.	Year of infection.	Deaths before the lines were moved.	Year of removal.	No. of infected left behind.	No. of infected who died later.	Distance the lines were moved.	No. of years the new lines have remained free.
New Rangamati	622	—	—	1895	—	—	300 yds.	18 yrs.
Old Salona (Rangamati)	800	1893	over 200	1897–8	140	fully 112	400 yds.	16 yrs.
Haspani ..	625	1897	about 75	1899	over 100	at least 60	800 yds.	14 yrs.
Kondoli ..	600	1892	over 150	1901	?	a few	—	12 yrs.
Kellydene ..	900	1895	320	1902–3	about 160	about 75	750 yds.	9 yrs.
Amlucki ..	1,800	1896	350	1900–1	about 100	47	½ mile	13 yrs.
Lung Soong ..	540	1902	about 35	1904–5	about 35	15	800 yds.	8 yrs.
Nonoi	312	1893	about 85	1905–6	about 40	about 12	¾ mile	8 yrs.
Meesa	550	1896	over 50	1905–6	25	17	600 yds.	8 yrs.
Seconee ..	678	1908	128	1911	98	23	600 yds.	2½ yrs.
Totals ..	6,727	—	1,393	—	698	361	—	—
Deaths per mille ..	—	—	207	—	—	517	—	—

That the improvement which resulted immediately upon removal to new lines was not due to any decline in the epidemic of the disease is clearly shown by the fact that the removals were not all carried out at the same time in the different lines, and further absolutely conclusive evidence to the same effect is furnished by two control coolie

lines which have not been moved and which still suffer from the disease to the present moment. In connection with one of these a kala azar camp was started in 1897, to which all evident and suspected cases of the disease were removed. The effect of this was to cause a drop in the number of cases from the lines during the four following years. In 1900 the segregation camp was broken up, whereupon the cases in the lines again began to increase. In 1905 disinfection directed towards the destruction of bed bugs in all the infected houses was undertaken, with the result that there was a marked decrease for six years. In 1901 a distinct recrudescence of the disease took place, while in 1913 there have been more deaths than in any year since 1899. It is thus clear that the partial measures adopted in the case of one estate have failed to eradicate the disease, and it is evident that so long as fresh material in the form of newly imported coolies is introduced into infected lines so long will the disease continue.

On the subject of the probable mode of infection the authors point out that the foregoing facts are of the greatest importance, for they prove that a few hundred yards are sufficient for permanent protection from kala azar, though a disease like malaria, which is carried by a flying insect, soon becomes as rife in the new as it was in the old lines. That water supply has nothing to do with it is shown by the fact that in several instances improvement has resulted though the old water supply has still been used by those in the new lines. For similar reasons food supply can be excluded. The authors conclude therefore that the bed bug, which clings to the old houses, is the most likely carrier of the disease. The somewhat slow spread compared with the rapid extension of malaria is explained when we consider the rarity with which the parasite of kala azar appears in the peripheral blood and the small percentage of bugs which become infected after actually taking up parasites, as demonstrated by the experiments of PATTON.

With regard to the permanency of recoveries from kala azar the authors state that one of them (Dodds Price) during 20 years experience has followed upwards of 2,000 cases from first to last on tea estates, and can personally vouch for over 150 permanent and complete recoveries in which the patients continue to do full work for years. These recoveries have resulted from no special line of treatment, but in their experience the authors find that if a kala azar patient who has reached the typical advanced stage of the disease with great emaciation once loses the fever, puts on flesh steadily for several months, and becomes well nourished, he or she will recover.

C. M. W.

CANINE LEISHMANIASIS.

i. PRINGAULT (E.). **Existence de la Leishmaniose canine à Marseille.** —*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 41-42.

ii. LAVERAN (A.). **Au Sujet d'un Cas de Leishmaniose canine signalé à Marseille.**—*Ibid.* Mar. No. 3. pp. 173-174.

In the former of these papers the author records the examination of fifty stray dogs in Marseilles for evidence of leishmania infection. In one, very much emaciated, a large infection of the bone marrow was found.

In the second paper Laveran points out that it is possible that this

dog was one imported from some place where canine kala azar was endemic. He draws attention to the importance of preventing the importation of this disease in dogs.

C. M. W.

Caronia & Di Giorgio (G.). **Sulla Leishmaniosi Spontanea nei Cani di Palermo.**—*Pathologica.* 1914. Apr. 15. Vol. 6. No. 131. pp. 208-209.

The examination of dogs in Palermo, Sicily, has been continued, with the result that the authors of this paper have encountered one case of canine kala azar out of 1,005 dogs examined. Previously Jemma had examined 300 dogs from Palermo and its suburbs and had met with two cases.

C. M. W.

Lemaire (G.), Sergent (Ed.) & Lhéritier. **La Leishmaniose naturelle du Chien à Alger. Etude clinique et anatomo-pathologique.** *Rev. Méd. d'Alger.* 1914. Jan. pp. 1-14. With 3 text figs.

This paper contains an account of the authors' experience of canine kala azar in the neighbourhood of Algiers. On account of the difficulty of diagnosing the disease in its early stages in dogs they are unable to fix any period of incubation. They recognise the disease as being of three types—the benign infection, the infection of moderate severity, and the acute infection.

Benign Infection. In this form of the disease the infected animals appear in good condition and examination of the organs reveals no leishmania or only very few. Sometimes in such cases culture on NNN medium from the marrow gives a positive result. The authors find that not infrequently dogs living in association with cases of kala azar have become wasted and lost their fur, but later have recovered completely except possibly for lesions of the eyes and ulcers about the eyes, nose and ears. In these cases it may be impossible to demonstrate leishmania either by culture on NNN medium or by examination of smears of the organs, yet the authors suspect that these have been cases of canine kala azar ending in recovery.

Medium Infection. Of all the types this is the most commonly seen. It usually ends fatally after a year or sixteen months. The dogs show an increasing emaciation and there results an extreme muscular weakness of the hind limbs so that the animal may be unable to stand. The hair is shed in patches or may come off entirely. At the angle of the mouth and eyes and upon the nose ulceration is common, while a frequent complication is keratitis resulting in opacity of the cornea. In spite of all this the appetite remains good till near the end, which is preceded by hypothermia and often diarrhoea. The spleen is found to be soft and hypertrophied or firm and hard, according as to whether the animal has or has not lived long enough for a terminal sclerosis to develop. The liver may also be sclerosed in later stages of the disease. The bone marrow is red in colour.

Acute Infection. In the acute infection there is a rapid wasting without there being any other symptom. The diagnosis can only be made by the actual discovery of leishmania, which occur however in such extraordinary numbers that frequently the cells of the organs

seem to be actually replaced by them. Dogs having the acute form of the disease usually die in a few weeks.

C. M. W.

LEMAIRE (G.), SERGENT (Ed.) & LHÉRITIER. **Spécificité de la Kératite observée chez les Chiens atteints de Leishmaniose naturelle.**—*Bull. Soc. Path. Exot.* 1914. Mar. Vol. 7. No. 3. pp. 193-196.

The authors insist upon the importance of keratitis as a sign of canine kala azar, since they have met with it in the case of three dogs naturally infected in Algiers. In some cases this sign may lead one to suppose such an infection even when leishmania cannot be discovered. In sections of the cornea it is noted that the surface epithelium is little changed but beneath it there are masses of cells and new blood vessels. The tissue of the cornea appears to be separated into layers by rows of cells or a richly cellular exudate. The cells are lymphocytes or large mononuclear cells and in many of these, especially in the anterior parts of the cornea, leishmania occur. Descemet's membrane is thickened and irregular on account of the presence of round and large cells containing parasites. In no part were polynuclear cells present, so that the authors think that they are justified in attributing this interstitial keratitis to the actual presence of the parasites. In long standing infection there is a tendency for the exudate to absorb and to be replaced by fibrous tissue.

C. M. W.

YAKIMOFF (V. L.) & SCHOKHOR (N. I.). i. **Recherches sur les Maladies Tropicales Humaines et Animales au Turkestan. (1) Répartition de la Leishmaniose canine au Turkestan.**—*Bull. Soc. Path. Exot.* 1914. Mar. Vol. 7. No. 3. p. 185.

ii. **Recherches sur les Maladies Tropicales Humaines et Animales au Turkestan. (2) La Leishmaniose cutanée (Bouton d'Orient) spontanée du Chien au Turkestan.**—*Ibid.* pp. 186-187. With 1 text fig

i. Between April and September 1913 the authors examined 647 dogs in Turkestan and found that 157 (24·26 per cent.) were infected with leishmania (canine kala azar). The distribution of the disease in dogs in the district is shown in the following table :—

Locality.	No. of Dogs Examined.	No. of Dogs Infected.	Percentage of Infection.
Taschkent	326	94	28·8
Village Toy-Tubé ..	8	4	28·8
Boukhara	107	27	25·2
Merv	40	1	2·5
Kouchka	17	4	23·5
Askhabade	100	7	7
Samarkande	49	20	40·8

[Besides they have encountered 31 cases of human kala azar (27 in children and 4 in adults).]

ii. The authors remark that NELIGAN was the first to show, by the discovery of leishmania in the sores, that dogs in Persia were liable to oriental sore. The present paper records the discovery of the disease in dogs in Tashkent. Some of the parasites in the lesions are so large (7·85μ × 2·35μ) that the authors think it a distinct variety and name it *Leishmania tropica* var. *canina*. In the human disease they have two varieties according to size, *Leishmania tropica* var. *minor* (Bukhara) (size 3·92 × 3·14μ) and *Leishmania tropica* var. *major* (Termese) (size 5·49 × 3·92μ).

C. M. W.

PEDROSA (Alex. M.). **Leishmaniose local do Cão. Local Leishmaniasis of Dog.**—*Annaes Paulistas de Medicina e Cirurgia.* 1913. Sept. Vol. 1. No. 2. pp. 33-39. With 1 plate.

This paper was read before the Medical and Surgical Society of S. Paulo in July and August 1912. The opening up of the north-west region of Brazil by railway resulted in numerous cases of dermal leishmaniasis. The disease was contracted in that part where the work was carried through the virgin forest on the left bank of the Tieté River. Travelling through this country in July 1912 the author came across one dog with an ulcerative condition of the nose, which appeared as if it might be a leishmaniasis. Unfortunately this dog was not examined microscopically. A second dog from Itapura Velha came under the author's notice. In this village only one case of leishmaniasis in man could be found, a case of five years' standing with only the nose and throat involved. The dog when seen was in very poor condition and, in addition to superficial ulcers on the body, had at the inferior and internal border of the left nostril an ulcer with regular hard cut edge and even base. Smears from this sore revealed numerous leishmania indistinguishable from those obtained from human cases. The dog died and examination of the internal organs for leishmania gave only negative result.

The author believes that the first dog seen by him was also a case of the disease, especially as this dog's master had an ulcer on the foot which had been diagnosed a dermal leishmaniasis. He was following a popular belief in allowing his dog to lick the sore on his foot, and it was during the course of this treatment that his dog developed the ulceration of the nose. It was probably a case of direct infection.

C. M. W.

TROPICAL SORE.

CHATTON (Edouard). **Le Bouton d'Orient (Clou de Gafsa) dans le Djerid. Ses Relations avec le Facies rupestre du Sol.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 30-35. With a map.

This paper contains an account of investigations into the conditions which are associated with the distribution of oriental sore in the Djerid district of Tunis. The disease is scattered irregularly through the region and only one condition appears necessary to its occurrence, the existence of a rocky soil within one or two kilometres of a human population. This rocky soil shelters a fauna peculiar to itself and herein may be found not only the insect carrier but possibly also some vertebrate reservoir of the virus.

C. M. W.

FOLEY (H.), VIALATTE (C.) & ADDE (R.). **Existence dans le Sud-Marocain (Haut-Guir) du Bouton d'Orient à l'Etat endémique.**—*Bull. Soc. Path. Exot.* 1914. Feb. Vol. 7. No. 2. pp. 114-115.

In North Africa the only centres in which oriental sore is endemic are Gafsa in Tunis and Biskra in Algeria. Isolated cases have been described by GROS in the valley of the Sebaou (Kabylie) and by CAMBILLET near Ténès. That the disease occurred in Morocco has been suspected for some time but the proof has not been forthcoming. In this paper the authors report the discovery of the disease with the finding of *Leishmania tropica* at Bou-Anan, longitude 6° West, latitude 32° North (South Morocco). This endemic centre appears to be separated from that of Biskra by a district long known to medical officers who have not reported in it a single case of oriental sore.

C. M. W.

JEANSELME (E.). i. **Leishmaniose cutanée à Foyers multiples et à Marche extensive très améliorée par le Salvarsan et le Néosalvarsan.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 36-41.

ii. **Bouton d'Orient à Foyers multiples et à Tendance extensive très amélioré par le Traitement d'Ehrlich.**—*Bull. de la Soc. Française de Dermatol. et Syph.* 1914. Jan. Vol. 25. No. 1. pp. 4-10.

These two papers contain accounts of a case of oriental sore contracted in the oasis of Southern Algeria. There were multiple lesions distributed on various parts of the body. The following injections were commenced two months after the appearance of the first sore :—

Dec. 22	intravenously	0·45 cg.	of neosalvarsan.
„ 26	„	0·60 cg.	„
„ 31	„	0·75 cg.	„
Jan. 6	„	0·30 cg.	of salvarsan.
„ 10	„	0·40 cg.	„

The neosalvarsan had no very marked effect on the sores. The salvarsan however caused them to dry and at the time of writing there was distinct improvement, though the scabs were not yet completely detached. During the treatment no degenerative change was noted in the leishmania from the sores, though they gradually decreased in number.

C. M. W.

WAGON (P.). **Un Deuxième Cas de Leishmaniose cutanée observé au Dahomey et traité par l'Arsénobenzol Billon en Lavements.**—*Bull. Soc. Path. Exot.* 1914. Jan. Vol. 7. No. 1. pp. 46-48.

The author records the case of a sergeant (the second case noted by him) who contracted cutaneous leishmaniasis while travelling in Dahomey in the Niger district. There were three sores on the right arm and in scrapings from these characteristic leishmania were found. He received an enema of ·60 gram of arsenobenzol dissolved in boiled water cleared by means of normal soda solution. At the same time 20 drops of tincture of opium were given by the mouth. There was some reaction in the form of intestinal colic. A week later

the treatment was repeated. The result was most definite, so that by the tenth day the lesions were well on the way towards healing and a fortnight later had quite disappeared.

C. M. W.

GIUGNI (Francesco). **Note Ematologiche su 4 Casi di Leishmaniosi Esterna (Bottone d'Oriente).**—*Malaria e Malat. d. Paesi Caldi.* 1914. Mar.-Apr. Vol. 5. No. 2. pp. 98-105. With 1 fig.

This paper records the results of an examination of the blood in four cases of oriental sore in Italy with a view to determining the leucocyte formula. In two cases blood taken from the periphery of the lesions was found to contain percentages of 69·2 and 61 of mononuclear leucocytes of various sizes. The finger blood of the four cases likewise showed a mononuclear increase, which was however not so large as that shown by the blood taken from near the lesions.

C. M. W.

BARBARA (Mario). **Nuovo Caso di Leishmaniosi Cutanea a Forma Molteplice.**—*Malaria e. Malat. d. Paesi Caldi.* 1914. Mar.-Apr. Vol. 5. No. 2. pp. 91-97. With 1 fig.; and *Ann. d. Med. Navale e Colon.* 1914. Feb.-Mar. Anno 20. Vol. 1. No. 2-3. pp. 161-169.

A case of oriental sore in a girl aged 15 years from Caltavuturo in Sicily. There were two sores present on the right side of the face. The author failed to obtain cultures of the leishmania though these were found in smears of the sores.

C. M. W.

HUNTEMÜLLER. **Neuartige Parasitenbefunde bei der Jerichobeule.** [A Seemingly New Parasite found in the Jericho Boil.]—*Centralbl. f. Bakt.* 1. Abt. Orig. 1914. Feb. 25. Vol.73. No. 2. pp. 137-141. With 3 plates and 1 text fig.

The author has been able to study in Jerusalem the material from three cases of Jericho boil, a disease which is clinically identical with oriental sore and has hitherto been supposed to be of this nature. In only one case was he able himself to obtain material directly from the sores. The two other cases were not actually seen by him, but he was able to examine material already fixed in sublimate or formalin. The first case was examined in the following way. Exudation from the sores was stained but revealed only bacterial infection. A portion of one was excised and smears from the cut surface were fixed while moist in sublimate alcohol and the tissue itself was fixed in the same fluid. In none of these were parasites found. In sections of the tissues from one of the other cases there were distributed in the large mononuclear cells bodies which owing to their distribution appeared to be leishmania. The large cells were often packed with them. On careful examination however the two nuclei characteristic of the leishmania could not be detected, while the bodies appeared distinctly smaller than the leishmania, having a diameter at most of about ·8μ. They were round or oval in shape and had each a single nuclear mass. On this account the author is led to believe that the bodies are organisms distinct from the leishmania and he suggests for them

the name *Plasmosoma jerichoense* and believes them to be the cause of the disease. [Perhaps it may be remarked here that it is notoriously difficult to make out details of the structure of leishmania in sections of fixed material. For some reason or another in such material actual leishmania often appear very much smaller than normal while only one of the two nuclei is visible. This may be the result of shrinkage in fixation. In the plates illustrating the sections of Jericho boil the author shows his parasite in the large mononuclear cells and here they appear exactly as leishmania so often do in similar sections, shrunken and with only one nucleus visible. It seems to the reviewer that the author may be dealing with such altered leishmania. It is unfortunate that the parasites were only seen in these sections and have not been examined in ordinary dried smears stained by Romanowsky stain, a method which reveals the characteristic structure of the leishmania so much better than the methods employed by the author.]

Not only is the clinical history of Jericho boil identical with that of oriental sore but the histological findings in sections of the sores correspond also, so that the author himself admits that apart from a difference in the parasite the two diseases are almost indistinguishable.

C. M. W.

Row (R.). **Generalised Leishmaniasis induced in a Mouse with the Culture of *Leishmania tropica* of Oriental Sore.**—*Bull. Soc. Path. Exot.* 1914. Apr. Vol. 7. No. 4. pp. 272-277.

Nicolle and Manceaux were the first to show that oriental sore could be induced in monkeys by the injection of cultures of *Leishmania tropica* of North Africa. Laveran later showed that this was true also of cultures of *L. tropica* of India. In 1913 Gonder published interesting results of experiments with cultures of *L. tropica*, whereby he had been able to produce in mice generalised infection with leishmania by their injection intraperitoneally. The culture used by Gonder was of the North African variety of *L. tropica*. Row in this paper states that he has likewise obtained a general infection in a mouse by the injection of cultures of *L. tropica* from oriental sore of Cambay, India. The type of infection produced and the post mortem appearances are identical with those produced by the injection of *Leishmania donovani* of kala azar. The author has previously shown that a local lesion can be produced by the subcutaneous injection of *L. donovani* so that he is led to state "that no matter what parasite (*Leishmania donovani* or *Leishmania tropica*) one deals with, it is possible to induce even with cultures a localised nodule or a generalised infection in both." Between the observations of Gonder and the author of the paper under review there are certain differences. Gonder noted that the mice in which he produced the generalised infection with *L. tropica* eventually developed cutaneous lesions in which the leishmania occurred. With injections of *L. donovani* no such lesions developed (this *Bulletin*, vol. 2, p. 449). Row has not seen cutaneous lesions in any of his infected mice.

Remarking on these experiments Laveran points out that they raise the whole question of the relationship of the two parasites of kala azar and oriental sore, an enquiry into which was first suggested by Sir Patrick Manson in 1907.

C. M. W.

i. Gaucher & Bloch (Maurice). **Bouton de Biskra et Réaction de Wassermann.**—*Bull. de la Soc. Française de Dermatol. et Syph.* 1914. Jan. Vol. 25. No. 1. pp. 2-4.

ii. Jeanselme (E.). **Bouton d'Orient à Foyers multiples et à Tendance extensive, très amélioré par le Traitement d'Ehrlich.**—*Ibid.* pp. 4-10.

The first authors reported to the Society a case of oriental sore which gave a positive Wassermann reaction. Jeanselme on the other hand reported a case (see above, p. 558) which had multiple sores on the face and limbs with some involvement of the lymphatic system, in which there was a negative Wassermann reaction. This case was treated with neosalvarsan intravenously with good results.

C. M. W.

McEwen (Ernest L.). **Oriental Sore in the Americas, with Report of a Case.**—*Jl. of Cutaneous Diseases incl. Syphilis.* 1914. Apr. Vol. 32. No. 4. [Whole No. 379.] pp. 275-286. With 1 plate.

This paper contains an interesting review of the history of the discovery of dermal leishmaniasis in South America. A case is described of a man who contracted a sore on the ear while travelling between Pacasmayo, Peru, and the Upper Amazon. The diagnosis was not made till after the patient had returned to Chicago. In scrapings from the ulcer, which was of the eroding type on the margin of the ear, there was found in addition to the leishmania a diplococcus which resembled the gonococcus in shape and size but was however Gram-positive. The author points out that diplococci of this type were first noted by Wenyon in oriental sore in Bagdad and then by Seidelin in this disease in Mexico.

C. M. W.

Carini (A.). **L'Emétique dans le Traitement de la Leishmaniose cutanée et muqueuse.**—*Bull. Soc. Path. Exot.* 1914. Apr. Vol. 7. No. 4. pp. 277-281.

It is pointed out that cutaneous leishmaniasis in South America is comparatively harmless, provided the disease does not extend to the mouth and nose, but that when it does so the condition induced is most serious. On this account it is most important to discover some efficacious line of treatment. The author, encouraged by some good results communicated by Vianna to the Brazilian Congress of Medicine, has been experimenting with tartar emetic in powder form. He has used it in a one per cent. solution in distilled water (not in physiological saline as usually advocated). The solution is sterilised in the cold by filtration, and injections of five to ten cc. of the solution have been made intravenously either every day or on alternate days according to the tolerance of the patient. Care has to be taken that the solution does not escape into the tissue surrounding the vein, in which case much pain results. Injected slowly into the vein there is no ill effect save occasionally a slight tendency to cough for a few minutes. Some hours after the injection, however, there may be muscular or articular pains of varying intensity.

The author gives the history of several cases which illustrate the successful nature of this treatment.

In *Case* 1 there were three sores on the face. Between December 15th and January 19th there were given 27 injections. By this time recovery was complete, the sores having entirely disappeared.

Case 2 was one in which the nose, mouth and pharynx were extensively involved. Forty injections (in which 3·55 grams of tartar emetic were given) sufficed to bring about a complete cure. The mucous membranes, which before were swollen and extensively ulcerated, returned to their normal condition.

Case 3 was again one of cutaneous and mucosal disease. Between November 22nd and December 24th six injections were given. Such great improvement had resulted that the patient discontinued treatment and returned to his home.

Finally there is mentioned a case in which the patient was in such a pitiable condition that all hope of his recovery had been abandoned. After several weeks of treatment the improvement was so marked that the author is led to describe it as a veritable resurrection. The author mentions the fact that Oscar d'Utra e SILVA has also obtained very good results with this line of treatment. LINDENBERG has employed with good result trixidine (emulsion in oil to forty per cent. of trioxide of antimony), recommended by KOLLE as being active against trypanosomes. The author considers it definitely proved that antimony is a very active medicament in cutaneous leishmaniasis.

C. M. W.

GORGA (José). **Leishmaniose das Mucosas.**—*Revista Med. de S. Paulo.* 1914. Feb. 15. Vol. 17. No. 3. pp. 35-40. With 3 figs.

Cases of dermal leishmaniasis with extensive involvement of the nose and mouth have come under the author's notice in North East Brazil and, in presenting these photographs showing the appalling conditions which may result from the disease, he reviews briefly the history of dermal leishmaniasis in South America.

C. M. W.

GUERREIRO (Cezar). **Da Reacção de Bordet e Gengou na Leishmaniose (Nota preliminar).**—*Brazil Medico.* 1914. Jan. 8. Vol. 28. No. 2. pp. 11-12.

This is a preliminary report of observations made by the author in the Oswaldo Cruz Institute on three cases of dermal leishmaniasis in reference to the reaction of Bordet-Gengou. As antigen the flagellates in cultures of leishmania were used after separation by centrifugation and cytolysis in distilled water. The reaction was definitely positive in the three cases, which all gave a negative Wassermann reaction. There was no evidence of a previous syphilitic infection in any of the cases.

C. M. W.

TYPHUS.

SERGENT (Edm.), FOLEY (H.) & VIALATTE (Ch.). **Transmission à l'Homme et au Singe du Typhus exanthématique par les Poux d'un Malade atteint de Fièvre récurrente et par des Lentes et Poux issus des Précédents.** [Transmission of Typhus from Man to Monkey by Lice obtained from a Relapsing Fever Patient and by the Eggs and Lice bred from them.]—*Compt. Rend. Acad. Sciences.* 1914. Mar. 30. Vol. 158. No. 13. pp. 964-965.

It is well known that epidemics of relapsing fever are often accompanied by cases of typhus and, since both are transmitted by the same carrier, namely the louse, this association is to be expected.

The authors were experimenting on the mechanism of the transmission of relapsing fever by lice, and for this purpose collected these insects from a patient suffering from this disease and subsequently made experiments with them on normal individuals. In four cases the subjects became infected from these lice, not with relapsing fever, but with typhus. The experiments were as follows :—

Lice and eggs were collected from a patient 11 days after the finish of a typical attack of relapsing fever, during which spirochaetes were present in the blood for six days. A large number of the adult lice in this lot showed numerous spirochaetes in their bodies.

Experiment 1. About 200 of these lice, collected from the patient on December 11th, were fed daily on a human subject, who became infected with typhus on December 25th.

Experiment 2. Another subject, on December 11th, was inoculated subcutaneously with the contents of 10 young lice collected off the above-mentioned patient. On December 19th, eight days later, he became infected with typhus.

Experiment 3. 55 eggs collected from the same patient on December 11th were crushed in saline solution and the resulting liquid placed on the slightly scarified surface of another subject. On December 16th, five days later, the latter became infected with typhus.

In addition, one of the authors, who looked after these three patients, became infected with the same disease. In all four cases the duration of the fever was 13 to 15 days.

Two monkeys were also infected with typhus by inoculating them, one subcutaneously and the other intraperitoneally, with the body contents of lice, collected from the patient of Experiment 1, on January 14th, six days after he had recovered from the attack. One became infected after four days and showed a high temperature for seven days, whilst in the other the incubation period was only three days and the monkey died on the 19th day. In addition another monkey was infected by the inoculation of blood from the former of these animals.

These experiments admit of the following conclusions :—

(1) Typhus can be transmitted from man to man by the bites alone of infected adult lice.

(2) Lice taken from a man infected in this way can in turn transmit the infection to monkeys, by subcutaneous or intraperitoneal inoculations. The passage to another monkey can be realised by the inoculation of blood from a monkey thus infected.

(3) The infection is hereditary in the louse ; the eggs laid by infected lice are also capable of producing the infection.

[These observations are very important. NICOLLE, BLAIZOT and

Conseil observed hereditary infection in lice infected with relapsing fever (see this *Bulletin*. Vol. 1. p. 32), but as a result of subsequent experiments concluded that it was very exceptional.]

E. Hindle.

Day (L. C.). **Typhus Fever in New Mexico. A Reported Outbreak among the Navajo Indians.**—*U.S. Public Health Rep.* 1914. May 1. Vol. 29. No. 18. p. 1068.

A record of a recent epidemic of typhus among the Navajo Indians, at Canoncito Cojo, about 40 miles west of Albuquerque, New Mexico. The total number of cases was 27—11 adults and 16 children—and there were four deaths (2 children and 2 adults). As a rule the children suffered less severely than the adults, though nearly all the patients were seriously ill for a short time at least, and all had a very marked eruption.

The first source of the infection was an old Mexico Indian who seemed ill on a visit to the camp about two weeks before the first case. The epidemic was arrested by placing all the people in quarantine who had been exposed to the contagion or were then sick, and by eradicating all lice from these persons and destroying or sterilising all fomites.

E. H.

Fraenkel (Eugen). **Ueber Fleckfieber und Roseola.** [Typhus and Roseola].—*München Med. Wochenschr.* 1914. Jan. 13. Vol. 61. No. 2. pp. 57-60. With 7 text figs.

In this paper the author discusses the histology of the cutaneous eruption in the case of typhus and typhoid respectively. The nature of the inflammation was found to be quite different in the two cases. In typhoid the small vessels of the skin become blocked up by bacilli and thus a thrombosis is produced, and the inflammation is a result of the engorgement and swelling of the vessels. In the case of typhus however there is no thrombosis, but the endothelium and elastic layers of the arterial walls are affected and a nodus is produced which is filled with an infiltration of lymphocytes.

[It might be mentioned, however, that the author has only examined preparations from two cases of typhus and, therefore, until more material has been examined, his results are open to criticism.]

E. H.

Markl. **Flecktyphus auf Schiffen.** [Typhus in Ships].—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Dec. Vol. 17. No. 23. pp. 805-809.

The author remarks that typhus is now an extremely rare disease on board ship and, in ten years' experience, he only came across one example of an outbreak, which occurred on a Greek steamer at Trieste. The expression "ship-typhus," that used to be applied to the disease, is therefore no longer applicable. During the past year, however, numerous outbreaks of typhus occurred on board the Lloyd Transport steamers, conveying refugees and wounded from the Balkans, and the author observed several cases in Trieste. The occurrence of the outbreaks agreed with the view that lice were responsible for the transmission. Markl then proceeds to add some notes on the symptoms of the disease.

Several attempts were made to culture organisms from the blood of typhus patients, but only negative results were obtained. On the other hand the polymorphonuclears containing red granules described by PROWAZEK (see this *Bulletin*, Vol. 2, p. 640) were observed in the blood, but their significance could not be determined.

Employing as antigen an alcoholic extract of the organs from a typhus body, a slight but distinct deviation of the complement was observed when the serum of typhus patients was compared with that of normal persons.

E. H.

OUFTUGEANINOFF (M.). **Le Traitement du Typhus "Exanthematicus" par l'Iode.**—*Presse Méd.* 1914. Jan. 28. No. 8. pp. 78-79.

In 1909 JAVOROWSKY published some interesting observations on the treatment of typhus by iodine. The author has employed the same medicament in the treatment of a number of cases of typhus, which came under his observation during 1912 and the beginning of 1913 at the hospital of Ekaterinodar (South Russia). In all 201 typhus patients entered the hospital during this period and of these 106 were treated with iodine, whilst the remainder were not given any of this substance. The percentage mortality was as follows :—

	No. of patients.	Dead.	Percentage mortality.
Total number of patients..	201	21	9·57
Treated with iodine ..	106	7	6·6
Without iodine	95	14	14.7

From these results it is evident that the administration of iodine has a decided effect on the mortality of the disease, and in addition the author states that this substance considerably mitigates the severity of the symptoms, such as the eruption and delirium.

The author administered the iodine mixed with milk or in the form of a potion, but he does not state what doses were employed.

E. H.

IOUDINE. **Le Typhus exanthématique dans les Mines de l'Arrondissement d'Iekaterinbourg.**—*Vestnik Obstchestvennoï Guiguieny.* 1913. Aug. p. 1275. (from a review in *Bull. de l'Office Intern. d'Hyg. Publique.* 1914. Feb. Vol. 6. No. 2. p. 360.)

During this epidemic there were 332 cases of typhus in eighteen months, and at the same time 145 cases of relapsing fever and 71 cases of typhoid were also recorded. In this region the movements of the population are very considerable and therefore it was essential that the habitations should be thoroughly disinfected. The most efficient disinfectant was found to be the following :—

Phenol (crystals)	1 part.
Naphthalene	1 ,,
Petrol	9 parts.
Russian turpentine	9 ,,

This liquid not only kills any insects that may be in the houses (bugs, fleas, etc.) but also their eggs. Wooden floors and any planks that serve as bedsteads should be sprinkled with the mixture at least twice

a month and, in addition, lodgings or similar places should be thoroughly disinfected from top to bottom every two months.

In addition free baths were placed at the disposal of the workers. For the disinfection of their clothes and house linen the author recommends the apparatus "Helios," the principle of which is very simple, so that it can easily be constructed in any desired locality.

E. H.

GOLDBERGER (Joseph). **Typhus Fever. A Brief Note on its Prevention.**—*U.S. Public Health Rep.* 1914. May 1. Vol. 29. No. 18. pp. 1068-1073.

The author again calls attention to the fact that typhus is endemic in several of the large American cities and in addition may be introduced from abroad. Thus, since November 19th, 1913, at least 19 cases have been discovered in immigrants arriving at Atlantic ports from Europe. Seven of these arrived at Providence from Marseilles and Naples, and 12 at the New York quarantine, mainly from southern European ports.

After a brief review of the symptoms and methods of transmission of the disease the author adds a few notes on its prevention. Community prophylaxis is probably easier and more effective in protecting the individual than the individual's own effort to guard himself, for in many parts it is almost impossible to avoid coming in contact with persons harbouring lice. When possible, public bath houses and wash houses, where the poor may bathe and do their washing at a minimum or without cost, should be provided, and troops in the field should be given the opportunity as frequently as possible to wash and scald or boil their body linen. Lodging houses, cheap boarding houses, night shelters, hospitals, jails and prisons, frequently constitute foci of the disease and should receive rigid sanitary supervision, including the enforcement of measures to free from lice all inmates of such institutions on admission.

With regard to individual foci, these should be dealt with by segregating and keeping under observation all exposed individuals for 14 days—the period of incubation—from the last exposure; by disinfecting (boiling or steam) the suspected bedding, body linen and clothes, for the destruction of any possible vermin that they may harbour; and by fumigating (with sulphur) the quarters that may have been occupied. The patient should be removed to "clean" surroundings, being very careful that he does not take with him any vermin. In the case of better class families it is reasonably safe to allow the patient to remain in his own home if this is quite free from vermin, and similarly the sulphur fumigation is unnecessary in this class of cases.

E. H.

Book Reviews.

Crawfurd (Raymond). Plague and Pestilence in Literature and Art. —222 pp. With 31 plates. 1914. Oxford: The Clarendon Press. [12*s.* 6*d.* net.]

This excellently illustrated volume, evidently the product of much research, reproduces the FitzPatrick Lectures delivered by the author before the Royal College of Physicians of London in 1912.

Pestilence in every form was regarded by our ancestors as the manifestation of the wrath of a deity, the Hebrew religion being no more advanced in this respect than the polytheism of Ancient Greece and Rome. Dr. Crawfurd takes his reader with him through the long catalogue of outbreaks of this kind which are recorded in European literature and art, down to the end of the 18th century, and certainly the array of human fatuity and impotence here revealed is calculated to make the practitioner of medicine thankful that his lot was not cast in an earlier age than the present one. Yet who shall say whether the chapter of folly is yet closed? One of the most important sections of the book is that in which Dr. Crawfurd delivers the verdict of an expert upon the plague of Athens recorded by Thucydides, which non-medical historians generally compare to the well-known plague of London; but Dr. Crawfurd is of opinion that the epidemic recorded by Thucydides was one of spotted typhus, of the kind that dogs the footsteps of an army, and finds a congenial soil in the conditions of a beleaguered city. The reasons which the author offers for this opinion must be sought for in the text, and will probably command professional approval.

Contemporary art can depict the mental attitude of our ancestors towards these fearful outbursts of epidemic disease far more effectively than any words of a writer; and so Dr. Crawfurd has been most liberal to his readers in the matter of illustration. The horrors of plague have perhaps never been more effectively put on canvas than in the picture by Micco Spadara, representing the plague of Naples in 1656 (Plate xxvi) and that by De Troy, of the outbreak at Marseilles in 1720 (Plate xxx). The physical difficulty of getting the dead buried under these awful conditions perhaps strikes the expert more forcibly than anything else.

The author of this work, we think, deserves the congratulations of his professional brethren upon a contribution to general literature which cannot fail to have a permanent value. Dr. Crawfurd's style is so simple and free from technicalities that the non-medical reader will be able to peruse the book with ease; and we should anticipate for it a ready sale.

J. B. Nias.

Schilling-Torgau (V.). Ausgewandte Blutlehre für die Tropenkrankheiten. [Monograph on Tropical Haematology.]—Mense *Handbuch der Tropenkrankheiten.* 2nd Edit. Vol. 2. pp. 1–170. 1914. Leipzig: Verlag von J. A. Barth.

This monograph deals with tropical haematology, not only in its application to tropical medicine, but also to the whole of our modern knowledge of this important subject. There is no branch of modern temperate, as opposed to tropical, medicine on which more light has been shed by recent discoveries than the study of the blood. Dr. Schilling is therefore not only to be congratulated on having embarked on this ambitious project, but on the success he has achieved in presenting his subject in such a well ordered form.

The first part of the 170 pages which the monograph contains is devoted to the methods of collecting blood for examination and of making and staining films. Considerable attention is directed to Ross's thick film method, which the author is inclined to recommend for rougher and more rapid diagnosis; for finer work he considers the destruction of the blood elements too great. The necessity for drying these films slowly for at

least half an hour in the incubator is insisted on. In fixing films Schilling does not recommend any of the wet methods. The neutral Giemsa stain (5 drops to 5 cc. neutral distilled water) finds favour as the most suitable for all kinds of blood work. Films should be stained for twenty minutes, but if insufficiently stained fresh solution can be added. Laboratory workers will find this section particularly useful; in it all available stains and their utility in blood work are discussed in detail. Considerable attention is devoted to a description of the author's apparatus for representing the differential leucocytic counts of value in diagnosis, by columns of variously coloured beads. No less than ten pages are devoted to a description of the erythrocyte, its development, regenerative and degenerative forms.

He classifies the anaemic blood picture somewhat elaborately as follows:–

(*a*) *The non-regenerative red blood picture* as found in

(1) Slight anaemia, accompanied by a loss of cells and haemoglobin.

(2) A regenerative anaemia with oligocythaemia, i.e., a chronic aplastic anaemia in which regeneration is prevented by a long continued toxic absorption and is characterised by severe loss of cells and of haemoglobin; or as a pure degenerative anaemia found also in cases of profound toxic absorption and characterised by poikilocytosis, microanisocytosis, reduction of haemoglobin content and number of red blood cells; colour index under ·5; or as a hyperchromatic-aplastic anaemia characterised by a low blood count, anisocytosis and an increase in the colour index.

(*b*) *The polychromatic red blood picture.*

(1) Purely regenerative, characterised by polychromasia, macrocytosis, temporary diminution of red cells, haemoglobin content raised.

(2) With degenerative enclosures, characterised by basophile granulations, anisocytosis, poikilocytosis, medium red cell count: colour index raised.

(*c*) *The normoblastic red blood picture.*

(1) Purely regenerative, characterised by polychromasia and macrocytosis, variable number of normoblasts, erythroblasts undergoing mitosis, polychromatic macro-normoblasts; diminution of red cell count below 3,000,000, rapidly rising to normal; haemoglobin index raised.

(2) With degenerative enclosures, characterised by small normoblasts, microblasts, nuclear remains, basophilic forms and macroblasts, anisocytosis, poikilocytosis etc. Red cell count low or progressively diminishing Haemoglobin percentage less than normal.

(*d*) *The megaloblastic red blood picture*, characterised always by toxic degenerative enclosures; a few megaloblasts and megalocytes, marked anisocytosis, poikilocytosis and schizocytosis; regenerative stages marked by polychromasia, basophilic granules; red cell count and haemoglobin percentage always diminished, the former often under one and a half millions; on the other hand the colour index is often above 1 (Hyperchromasia).

All these types of blood picture may present themselves in any diseased condition marked by blood destruction and depend solely upon the degree of anaemia produced in different diseases. The blood picture becomes of importance only when taken in conjunction with other symptoms and then only can it be regarded as of diagnostic value. The types of leucocytes and their significance are also classified in considerable detail as follows :—

1. Granulocytes
   - (*a*) with basophilic
   - (*b*) with eosinophilic
   - (*c*) with neutrophilic

   } granulations ·5 %, 3 %, 60–70 % } in normal blood.

2. Lymphocytes (always hyaline) 30 % ,,
   possibly capable of subdivision into
   - (*a*) small and medium sized.
   - (*b*) large and immature lymphocytes.

3. Large mononuclears and transitional cells (with azurophilic granules) 6 per cent. in normal blood.

The thoroughness of the work and elaboration of detail may be judged from the number of pages (18) devoted to a consideration of the blood changes in malaria and blackwater fever.

One is surprised to note that considerable space is devoted to the subject of lateral displacement of the leucocytic nucleus to the left as a sign of blood regeneration in malaria and blackwater fever, which Schilling believes to be a sign of considerable prognostic significance.

The blood changes in trypanosomiasis are summed up as follows:

(1) a progressive anaemia with slight attempts at regeneration; (2) during the acute phase a neutrophile excess with nuclear displacement; (3) a mononuclear increase commensurate with a diminution in the number of trypanosomes; (4) small and medium sized lymphocytes relatively and actually increased; (5) the eosinophiles reduced as in all other intoxications, but after the cessation of symptoms reappearing in numbers. The blood changes in schizotrypanosomiasis (*S. cruzi*)—a well marked lymphocytosis with a relatively low mononuclear increase—are of interest, as we do not remember to have seen them quoted before.

Leishmaniasis is considered under the headings of Kala azar, Infantile leishmaniasis and Oriental sore. The blood count of uncomplicated amoebiasis shows little of interest, though a good deal of attention is directed to the well-known polymorphonuclear leucocytosis in liver abscess. Under yellow fever Schilling again brings forward weighty arguments against the validity of SEIDELIN'S *Paraplasma flavigenum*. These bodies he believes to be identical with the nuclear remains so often encountered in the erythrocytes in severe anaemia; especially since similar bodies are also found in young guinea-pigs, a circumstance which renders the proof of alleged communication of yellow fever to these animals, founded on the presence of these bodies in the erythrocytes after an inoculation wit yellow fever blood, of doubtful value.

The four diseases, yellow fever, dengue, pappataci fever and seven day fever, apparently in so many ways closely allied, are characterised by a leucopenia and a relative mononuclear increase, facts supporting the hypothesis of an infection with an ultramicroscopic germ. Though as yet scarcely sufficient study has been devoted to verruga peruana, the blood changes appear to be of the most anomalous nature, the exact significance of which still awaits elucidation. The degenerative changes in the red cells are of the most pronounced character; the refractile structures in the centre of the erythrocytes resemble small paranuclear bodies in the megaloblasts of the bone marrow of young guinea-pigs. The so-called *Anaplasmata* of GALLI-VALERIO Schilling would relegate to the group of marginal degenerations of the red cell (Randkörnchen).

In smallpox Schilling summarises the typical blood picture as specific and as the result of stimulation of the whole blood system, resulting in a myelocytosis with development of small mononuclear cells.

It cannot be said that the blood picture in beri-beri shows any particular features. In sprue on the other hand the anaemia is protean and may resemble in almost every detail that of pernicious anaemia. In the early stages the anaemia is of the aplastic type (up to and above 60 per cent. haemoglobin). Schilling, as a result of his own observations, concludes there is a leucopenia and a displacement of the leucocytic nuclei to the right, an observation he considers of some importance. He concludes that the blood picture undoubtedly hall-marks sprue as an intestinal toxaemia.

In undulant fever the blood picture is on the whole that of a chronic septicaemia, but differs slightly in the differential leucocyte count. In leprosy and relapsing fever it is of small value.

Fourteen pages are devoted to a consideration of helminthiasis and especially of the diagnostic and prognostic value of eosinophilia. In ankylostomiasis the changes in the red cells indicate absorption of some toxic product and contraindicate the view of an anaemia caused by actual absorption of blood by the parasite. In bilharziasis of all species the eosinophilia is generally above 30 per cent. In filariasis the blood changes are considered to be a cardinal sign, seeing that an eosinophilia may be the only sign of infection in the absence of either periodic or non-periodic microfilariae.

Three very excellent blood plates, the most artistic and definite we remember to have seen, and an exhaustive list of the literature, occupying 21 pages, conclude the monograph.

Though many of the blood changes in different tropical diseases are only of doubtful value and significance, it is advantageous to find a description of them in such elaborate detail and in the compass of one volume. Much more work is required before we can hope to obtain an idea of the "pure blood picture" of different tropical diseases, as for instance beriberi or leprosy in natives who are invariably infected with some form of helminthiasis. Great care should be exercised in quoting results of workers whose statistics are of doubtful value.

The ponderous phraseology of the German language does not lend itself to an attractive setting forth of such a technical subject and consequently some of the descriptions appear at first sight rather involved.

P. H. Bahr.

LUDLOW (C. S.). **Disease-Bearing Mosquitoes of North and Central America, the West Indies, and the Philippine Islands.**—*U. S. Army War Dept., Office of the Surgeon General. Bulletin* No. 4. 1914. Nov. 96 pp. With 27 plates and 29 figs.

This little compilation consists mainly of descriptions—for the most part in considerable detail—of about thirty species of Anopheles known to exist in the regions indicated in the title, and of a few notorious Culicini, to wit, *Culex fatigans*, *Stegomyia fasciata*, and two species of *Mansonia*. It also contains some preliminary remarks upon the classification of mosquitoes, some general notes upon their breeding-places and life-history, some instructions for collectors, and—as is duly acknowledged in a footnote—some long extracts from STEPHENS's paper in the *Bulletin of Entomological Research* for 1911 (vol. 2, p. 1) on "Methods for detecting Sporozoits and Zygotes in Mosquitoes infected with Malaria."

As the book is stated in the official preface to be intended for the instruction of medical officers, it is a pity that the descriptions of species are so long and so lacking in distinction and point. There is no doubt that short critical diagnoses, in which the salient specific features are emphasised, are much more telling and much less likely to be misleading than tedious descriptions in which characters common to many species are again and again repeated. It would also have been more convenient if the species had been arranged geographically.

It is doubtful whether the medical officer, whose work is a long exercise in the exact observation of physical signs and symptoms, and of their classification according to the sum of their agreements and differences, will find much inspiration in the remarks upon classification, which is a logical, not an arbitrary, process whether one is dealing with mosquitoes or with other things.

A. Alcock.

ERRATUM.

Dr. Robert LESK (Weltevreden) points out that in the review of his paper published in this *Bulletin*, Vol. 3, p. 69, the expression "gave a vague history of having had dysentery some months before" is incorrect; the German original is to the effect that the boy had already suffered for some months from dysentery. The error appears to be due to the word "for" having dropped out before "some months" and to the omission being overlooked in proof reading.

INDEX OF AUTHORS.

A.

Abbatucci. *See* Lafage & Abbatucci.
Acton, H. W., & Knowles, R., 269, 270, 524.
Adde, R. *See* Foley, Vialatte & Adde.
Adler, H. M., 311.
Akashi, M., 77.
Alessandrini, G., 285.
Alfred-Khoury, M., 328.
Allain, J., 438, 452.
Allan, W., 452.
D'Almeida, T., 527.
De Almeida, A. O., 295.
—— T., (Jr.), 144.
Aloy, A. C., 452.
Andrews, W. H., 271.
Annales d'Hygiène et de Médecine Coloniales, 409, 452.
Arantes, J. B., 520.
Archibald, R. G., 289.
——. *See* Chalmers & Archibald.
Arlo, J., 239.
Armstrong, E. R., 398.
Army, Report on Health of, 362.
Arnaud, 475.
Arnold, W. J. J., 320.
Aubert, P., Monfort, F., Heckenroth, F., & Blanchard, M., 36.
Aubrey, G. E., 292.
Aubry. *See* Dumolard, Aubry, & Granger.
Aumann, 473.
Austen, E. E., 427.

B.

Babington, W. H., 144.
Bacot, A. W., 204, 205, 209.
—— & Martin, C. J., 201.
Baetge, P., 258.
Baetz, W. G. *See* Deeks & Baetz.
Bahr, P. H., 461.
Bailey, R. T., 300.
Baker, C. J. *See* Uganda Protectorate.
Balfour, A., 15, 167, 264.
Barbara, M., 559.
Barber, M., 280.
Barratt, J. O. W., 163, 271.
—— & Yorke, W., 261.
Barres, *See* des Barres, Leroy.
Barreto, M. G., 163.
Bartet & Defressine, 217.
Bass, C. C., 438.
Bassett-Smith, P. W., 133.
Bates, L. B., 459.
Bath, C. H., 379.
Bauer, J., Ellenbeck & Fromme, 89.
Baujean, R. *See* Sambuc & Baujean.
Baur, J., & Plisson, L., 71.
Bayma, T., 254.
Bayon, H., 188, 504.
Beck, M., 246.
Béguet, M. *See* Sergent, Edm. & Et, Béguet & Plantier.
Behrend, K., 457.
Behrenroth, E., 92.
Bell, J., 452.
Bentley, 353.
Bequaert, J. *See* Rodhain, Pons, Vandenbranden & Bequaert.
Bertarelli, E., 259.
Betts, A. J. V., 449.
Biehler, R., 199.
Bijon, 444.
Bindi, Nello, 113.
Binger, C. A. L. *See* Wolbach & Binger.
Bishop, T. H., 359, 488.
Bizard, 71.
Blacklock, B., 535.
—— & Yorke, W., 39, 168, 169.
—— *See* Yorke & Blacklock.
Blaizot, L. *See* Nicolle, Blaizot & Conseil.
Blanchard, M., 4, 398.
——. *See* Aubert, Monfort, Heckenroth & Blanchard.
——. *See* Heckenroth & Blanchard.
——. *See* Mesnil & Blanchard.
Bloch, M. *See* Gaucher & Bloch.
Boecker, E. *See* Neufeld & Boecker.
Bofinger, 458.
Boletim da Sociedade Brasileira de Dermatologia, 141.
Bombay Bacteriological Laboratory, 378.
Bond, A., 71.
Bordoni, E. F. *See* Volpino & Bordoni.
Börnstein, 381.
Bouffard, G., 433.
Bouilliez, M. *See* Leger & Bouilliez.
Bourret, 66.
——, G., 463.

Boyé, L., 443.
Branch, E. R., 104.
Brau, P., 67, 83, 94, 452.
Brault, J., 239.
Braun, H., 421.
—— & Teichmann, E., 421.
Breinl, A., 229.
Brelet, M., 453.
Brieger, L., & Krause, M., 249.
Brignone, E., 437.
British Guiana, 349.
Brockman. *See* Drake-Brockman.
Brooke, R., 435, 455.
Brooks, R. St. J., 206.
Broquet, C., 434.
Brown, W. H., 542.
Bruce-Porter, H. E. B., 261.
Brues, C. T. *See* Strong, Tyzzer, Brues, Sellards, & Gastiaburu.
Brumpt, E., 425.
—— & Pedroso, A., 140.
——. *See* Tissier & Brumpt.
Brunetière, 98.
Bryson, A. C., 292.
Buck, J. M. *See* Mohler, Eichhorn & Buck.
Busch, 86, 208.
Butler, G. G. *See* Statham & Butler.

C.

Calkins, G. N. *See* Williams & Calkins.
Calô, E. *See* Conor & Calô.
Calwell, W. *See* Reid & Calwell.
Campbell, C. K. Z., 380.
Canal Record, 379.
Canavan, M. M., 88.
Candiotti, 476.
Cannata, S., 137, 545.
Cano, U., 113.
Canstatt, L. & T., 490.
Cantacuzene, J., & Marie, A., 485.
Cantarutti, G. B. & Others, 314.
Cantlie, J., 70, 94.
arini, A., 72, 239, 561.
—— & Maciel, J., 127, 519, 534.
Caronia, G., 134.
—— & Di Giorgia, G., 555.
—— *See* Di Cristina & Caronia.
Carpenter, G. D. H., 41.
Carter, H. R., 159.
—— R. M., 449.
Cartolari, E., 258.
Castellani, A., 283, 464, 521.
—— & Philip, 368.
Cavallone, G., 295.
Cazamian, 70.
Cazeneuve, H., 218.
—— *See* Defressine & Cazeneuve.
von Celebrini, E., 156.
Celli, A., 437.
Certain, V. *See* Grysez & Certain.
Ceylon, 346, 366, 383.
Chagas, C., 226.
Chalmers, A. J., & Archibald R. G., 327.
—— & O'Farrell, W. R., 6, 236.
Chamberlain, W. P., 224.
Charles, H. C., 223.
Chatard, J. A., & Guthrie, C. G., 243.
Chaterji, K. K., 450.
Chatton, E., 557.
Chauffard, A., 453.
Chitre, G. D. *See* Morison & Chi re.
Chrètien. *See* Martel, Tanon & Chrètien.
Christin, E. F., 436.
Christophers, 353.
—— S. R. *See* Ross, Christopers & Perry.
Ciaccia, M., 488.
Ciuca, A., 249.
——. *See* Jonisco-Mihaesti & Ciuca.
Clarke, J. T., 320.
Clegg, M. T., 191.
Cloud, R. E., 72.
Cochran, S., 130.
Cockin, R. P., 242.
Cohn, J., 533.
Collett, J. W. *See* Sierra Leone.
Colombier, P., 499.
Commissione Pellagrologica Provinciale di Belluno, 302.
Conor, A., 330.
—— & Calô, E., 545.
—— & Marchetti, C., 237.
Conseil, E., 1, 3, 402.
——. *See* Nicolle, Blaizot & Conseil.
Cooley, R. A., 231.
Cordier, 70.
Da Costa, B. B., 294.
Couret M. & Walker, J., 80.
Couvy, L. *See* Marchoux & Couvy.
Cragg, F. W. *See* Patton & Cragg.
Craig, C. F., 74.
Craster, C. V., 470.
Crawfurd, R., 567.
Di Cristina, G., & Caronia, G., 134.
Culpepper, W. L., 236.
Cunningham, J., 90.
—— & Harvey, W. F., 463.
Cutter, J. A., 54.

D.

Daniels, 337.
Danysz, J., 37, 412, 531.
Darling, S. T., 456.
Davies, T. S., 498.
Day, E. C., 267.
—— L. C., 564.
Debré R. *See* Ladouzy & Debé.
Deeks, W. E., & Baetz, W. G., 228.

Defressine. *See* Bartet & Defressine.
—— C., & Cazeneuve, H., 115, 478, 481.
Degrais. *See* Quénu & Degrais.
Delanoë, P., 253, 423, 540.
—— M., & Mme. P., 523.
Della Vida, M. L., 116, 212.
Deneufbourg, 434.
Denier, 462.
Deppe, L., 258.
Des Barres, Leroy, 71, 316.
Desderi, P., 458.
Dessy, S., & Marotta, R. A., 72.
Dick, M. I., & Rutherford, W. J., 278.
Diesing, 28.
Dominici-Urbani, C. See Leger & Dominici-Urbani.
Donovan, 364.
Dopter, 71.
—— C., 453.
—— M., & Pauron, M., 71.
Douglas, S. R., 66.
Drake-Brockman, R. E., 4, 263.
Drennan, J. G., 481.
Dresel, E. G., & Marchand, F., 459.
van Driel, B. M., 207.
Driscoll, T. L., 305.
Drummond, J., 307.
Dubois, A. *See* Mouchet & Dubois.
Duke, H. L., 31, 245, 344.
Dumas, R., 460.
Dumolard, Aubry, & Granger, M., 144.
Dunn, C. L., 360, 487.
Dupont, V. *See* Lafont & Dupont.
—— *See* Mouneyrat, Tanon & Dupont.
Duval, C., 500.
Duvigneau, 398.

E.

East Africa Protectorate, 234.
Eckard, B., 26.
Eichhorn, A. *See* Mohler, Eichhorn & Buck.
Ellenbeck. *See* Bauer, Ellenbeck & Fromme.
Ellis, A. W. M. *See* Swift & Ellis.
Emmerich, R., 105.
Enernao, T., 298.
Ettinger, W., 256.
Eustis, A., 453.
—— *See* Wellman, Eustis, & Schochet.
Evers-Angaur, 463.
von Ezdorf, R. H., 256.

F.

Falcioni, D., 47.
Fambri, E., 190.
Fantham, H. B., & Porter, A., 124, 128.
Federated Malay States, 502.
Ferrannini, L., 302.
Field, F. E., 72.
——. *See* Minett & Field.
Finato, D. L., & Novello, F., 314.
Fine, M. S. *See* Myers & Fine.
Fischer, W., 457.
Fletcher, W. *See* Fraser & Fletcher.
Flourens, 20, 182.
Flu, P. C., 478, 482.
Foley, H., Vialatte, C., & Adde R., 558.
——. *See* Sergent, Foley & Vialatte.
Fontoynont & Razafimpanilo, 55.
Fox, C., 370.
Fraenkel, E., 564.
Fraga, C., 51.
Franchini, G. *See* Laveran & Franchini.
Francis, E. E., 327.
Fraser, H. *See* Malay States.
—— & Fletcher, W., 505.
—— & Stanton, A. T., 319.
Fricks, L. D., 232, 325.
Friedmann, M., 86.
Fromme. *See* Bauer, Ellenbeck & Fromme.
Fülleborn, F., 97, 393.
—— & Simon, 100.
Funk, C., 311, 331.

G.

Gabbi, U., 545.
Gäbel, M., 465.
Gaide, 328.
—— L., & Mouzels, P., 453.
Gallas, 107.
Galli-Valerio, B., 400, 523.
Galt, W. S., 320.
Garcin. *See* Sacquépée & Garcin.
Garrison, P. E. *See* Siler, Garrison & Mac Neal.
Gasbarrini, A., 145.
Gasiorowski, N., 470.
Gastiaburu, J. C. *See* Strong, Tyzzer, Brues, Sellards, & Gastiaburu.
Gaucher & Bloch, M., 561.
Gauducheau, A., 78.
Gehring, E. W., 300.
Gelei, J., 125.
Genovese, F., 436.
German East Africa, 527.
Gettings, H. S., 84, 459.
Giemsa, G., & Werner, H., 257.
Gill, 353.
Di Giorgio, G. *See* Caronia & Di Giorgio.
Gioseffi, M., 207.
Giugni, F., 559.

Gleitsmann, 16.
Gloster, T. H., 484.
Gnanapraksam, 389.
Goéré, J., 106.
Goldberg. *See* Mendeleeff-Goldberg.
Goldberger, J., 566.
Gold Coast, 374.
Goldi, E. A., 117.
Golini, O., 211.
Gomes de Faria & Travassos, L., 277.
Gonder, R., 403.
Goodhart, S. P., 257.
Goodhue, W. J. *See* Mc Coy & Goodhue.
Goretti, G., 172.
Gorga, J., 562.
Gorgas, 366.
Graham, G. F. *See* Smith & Graham.
Granger, M. *See* Dumolard, Aubry & Granger.
Gray, A. C. H., 136.
Greer, A. E., 453.
Greig, E. D. W., 109, 114, 477, 479, 486.
Grossule, V., 168, 252.
Grothusen, 52.
Grysez, V., & Certain, B., 208.
Guerreiro, C., 562.
Guillemet, 453.
Guiteras, J., 224.
Gunasekara, S. T., 151.
Guthrie, C. G. *See* Chatard & Guthrie.

H.

Hadwen, S., 230.
—— & Nuttall, G. H. F., 231.
Hagemeister, W., 541.
Hahn, B., & Kostenbader, 20.
Halberstaedter, L., 414, 530.
Harris, W. H., 304.
Harriss, S. A., 486.
Hartoch, O. *See* Kolle, Hartoch & Schürmann.
Hartsock, F. M., 453.
Harvey, W. F. *See* Cunningham & Harvey.
Hata, S., 18.
Hearsey, H., 21.
Heckenroth, F., & Blanchard M., 251.
——. *See* Aubert, Monfort, Heckenroth & Blanchard.
——. *See* Kernéis, Monfort & Heckenroth.
Heiser, V. G., 52, 194.
v. d. Hellen, 411.
Henningfeld, F., 429.
Henry, H., 126.
Henson, G. E., 48, 59.
Hervier. *See* Maurras & Hervier.
Hetzer, M., 513.
Heymann, P., 71.
Hill, L., 326.
Hillman, O. S., 310.
Hindle, E., 379.
Hintze, K., 91.
Hirst, L. F., 205.
Hitchens, A. P., 218.
Hodges, A. D. P. *See* Uganda Protectorate.
Hofer, G., & Hovorka, J., 111.
Hogg, C. A., 303.
Hollmann, H. T., 189.
Honeij, J. A., 498.
——. *See* Wolbach & Honeij.
Hong Kong, 263.
Hooton, A., 450.
Hopkins, F. G., 183.
Hovorka, J. *See* Hofer & Hovorka.
Howe, W. B. W., 48.
Howlett, F. M. *See* Rieley & Howlett.
Hudson, C. T., 450.
Huet, 83.
Hügel, G., 19.
——. *See* Uhlenhuth & Hügel.
Humphry, A. D., 9.
Huntemüller, 559.
Hunter, S. J., 303.

I.

Ibba, F., 436.
Inman, W. S., 409.
Ionesco-Mihaesti & Ciuca, 484.
Ioudine, 565.
Izar, G., 219.
——, & Nicosia, R., 435.

J

Jackson, R. W. H., 268.
Jamaica, 226.
James, S. P., 179.
—— & De Silva, 346.
——, W. M., 447, 454.
Janin, F., 195.
Jaunot, A., 139.
Javelly, E. *See* Leboeuf & Javelly.
Jeanselme, E., 558, 561.
Johnston, J. E. L., 183.
—— & Macfie, J. W. Scott, 37.
——. *See* Macfie & Johnston.
——, T. H., 291.
Johnstone, E. M., 306.
de Jonge, G. W. K., 453.
Jouveau-Dubreuil, H., 285, 434.
Joyeux, C., 119, 325.

K.

Kabeshima, 479.
Katsurada, F., 290.
Keister, W. S. *See* Stiles & Keister.
Kelly, W. D. G., 453.
Kennan, R. H. *See* Sierra Leone.
Kennedy, J. C., 214.

Kenrick, W. H., 158.
Kernéis, J., Monfort, F., & Heckenroth, F., 241.
Kerr, T. S., 408.
Keuper, E., 458.
Khoury. *See* Alfred-Khoury.
King, W. G., 265, 333, 365.
——, W. V., 264.
Kirkham, V. H. *See* East Africa Protectorate.
Kleine, F. K., 415.
Klimenko, W. N., 482.
Kloppers, J. W. E. R. S., 241.
Knab, F., 274.
Knapton, H. A. F., 361, 487.
Knowles, R. *See* Acton & Knowles.
Kobler, G., 105.
Kolle, W., Hartoch, O., & Schürmann, W., 247.
v. Konschegg, A. & Weltmann, O., 108.
Kopp, K., 283.
Kostenbader. *See* Hahn & Kostenbader.
Krause, M. *See* Brieger & Krause.
Kuczynski, M. H., 517.
Kuenen, W. A., & Swellengrebel, N. H., 76.
Külz, L., 157, 225, 317.
Kumagawa, M., 456.

L.

Lafage & Abbatucci, 363.
Lafont, A., & Dupont, V., 410.
——. *See* Roubaud & Lafont.
Lagane, L., 514.
Lamas, L., 483.
Lamballe, F. W., 148.
Lamoureux, A., 5.
Landouzy, L., & Debré, R., 448.
Lane, C., 293.
Langley, W. H. *See* Nigeria, Southern.
Lapage, G. *See* Woodcock & Lapage.
Lara, A., 287.
Launoy, L., 16.
——, Lévy-Bruhl, M., 17, 18, 405.
Laveran, A., 44, 130, 174, 254, 546, 554.
—— & Franchini, G., 122, 515.
—— & Marullaz, M., 252, 511, 522.
Lavinder, C. H., 300.
Law, W. F., 220.
Leboeuf, A., 493.
—— & Javelly, E., 190.
—— & Salomon, E., 494.
Le Fanu, C. V., 164, 374.
Le Gallen, R. *See* Leger & Le Gallen.
Legendre, J., 263, 264.
Léger, 434.
Leger, M., 288.
—— & Bouilliez, M., 159.
Leger, M. & Dominici-Urbani, C., 214.
—— & Le Gallen, R., 315.
—— & Sauvet, C., 286.
Legrand, H., 68.
Leiper, R. T., 333, 374.
Lemaire, G., Sergent E., & Lhéritier, A., 138, 555, 556.
Lempriere, L. R., 306.
Lesk, R., 69, 281, 570.
Lessing, F. M., 91.
Levaditi, C., & Mutermilch, St. 173.
Levi della Vida, M., 116, 212.
Lévy-Bruhl, M. *See* Launoy & Lévy-Bruhl.
Lewin, K. R., 125.
Lhéritier, A. *See* Lemaire, Sergent & Lhéritier.
Lignos, A., 544.
Liston, W. G., 112.
Lloyd, Ll., 426.
Loewy, D., 475.
Lofton, L., 305.
Logan, O. T., 12, 111.
van Loghem, J. J., 182, 365, 480.
Lo Re, M., & de Stefano, S., 133.
Low, G. C., & Others, 96.
——, R. B., 469.
De Luca, M., 328.
Ludlow, C. S., 570.
Lundie, A., 244.
Lunn, W. E. C., 460, 475.
Lurz, R., 411.
Lutsch, W., 463.
Lynch, A. J. *See* Smith, Lynch & Rivas.
Lyons, R., 72.

M.

McCaskey, G. W., 453.
McCoy, G. W., 191, 192, 197, 199.
—— & Goodhue, W. J., 188.
McCulloch, H., 291.
——, H. D., 55.
Macdonald, A., 184, 384.
MacDonald, J. B., 300.
McEwen, E. L., 561.
Macfie, J. W. Scott, 29, 528.
—— & Johnston, J. E. L., 26, 170, 276.
—— *See* Johnston & Macfie.
MacGilchrist, A. C., 146, 147.
Maciel, J. *See* Carini & Maciel.
MacNeal, W. J., 309.
——. *See* Siler, Garrison & MacNeal.
Maddock, E. C. G., 450.
Madras Govt. Orders, 388, 389.
——Presidency, 353.
Maia, De Passos D., 273.
Malay States, 319.
Malouvier, 433.
Manteufel, 155.

Marchand, F. *See* Dresel & Marchand.
Marchetti, C. *See* Conor & Marchetti.
Marchoux, E., 505.
—— & Couvy, L., 13.
Marie, A. *See* Cantacuzene & Marie.
Markl, 564.
Marotta, R. A. *See* Dessy & Marotta.
Marotte & Morvan, 97, 98.
Marshall, C. H., 218.
Martel, 453.
——, Tanon & Chrètien, 215.
Martelli, P. N., 47.
Martin, C. J. *See* Bacot & Martin.
Martini, 240.
Martoglio, F., 44.
Marullaz, M., 430.
——. *See* Laveran & Marullaz.
Mathis, 433, 495.
——, C., 80, 448.
Maurras & Hervier, 453.
Maxwell, J. L., 228.
May, S. A., 23.
Mayer, M., 466.
—— & Werner, H., 136.
Mazzolani, D. A., 235.
Medical Missions in India, 453.
Medizinal-Berichte über die Deutschen Schutzgebiete für das Jahr 1910–11, 176.
Meirowsky, E., 406.
Mendeleeff-Goldberg, P., 45.
Mendoza, A., 490.
Mense, C., 301, 395.
Meredith, D., 305.
Mesnil, F., 170.
—— & Blanchard, M., 407.
Michailow, S. 489.
Migliano, L., 521.
Millous, 489.
Milton, F., 289.
Minchin, E. A., 120.
Minett, E. P. *See* Wise & Minett.
—— & Field, F. E., 141.
Mitzmain, M. B., 31.
Miyairi, K., & Suzuki, M., 289.
Miyaji, S., 128.
Mohler, J. R., Eichhorn, A., & Buck, J. M., 424.
Moldovan, J., 413.
Monfort, F. *See* Aubert, Monfort, Heckenroth & Blanchard.
——. *See* Kernéis, Monfort & Heckenroth.
Moreau, L., 57, 495.
Morison, J., & Chitre, G. D., 460.
Moriyasu, 67.
Morrison, 378.
Morvan. *See* Marotte & Morvan.
Mouchet, R., 98, 276.
—— & Dubois, A., 529.
Mouneyrat, Tanon & Dupont, 401.
Moustouses, K. J., 474.
Mouzels, P., 10.
——. *See* Gaide & Mouzels.
Mühlmann, M., 464.
Muller, 183.
Munro, D., 450.
Mutermilch, St. *See* Levaditi & Mutermilch.
Myers, V. C., & Fine, M. S., 310.

N.

Napier, A. H., 143, 162.
Natale Salvatore, 216.
Natonek, D. 86.
Nawrotzky, N. N., 513.
Neiva, A., 30, 175, 405.
Nello. *See* Bindi Nello.
Netter, A., 491.
Neubert, 74.
Neufeld, F., & Boecker, E., 401.
Newman, E. A. R., 450.
Newton, H. M., 111.
Nicholson, F., 278.
Nicoll, W., 287, 296.
Nicolas, C., 329.
Nicolle, C., Blaizot, L., & Conseil, E., 2.
Nicosia, R. *See* Izar & Nicosia.
Nigeria, Southern, 333.
Nightingale, P. A., 305.
Niles, G. M., 308.
Noc, F., 514.
—— & Stévenel, L., 316, 511.
Nocht, B., 442.
Nogué, 454.
Noland, L., & Watson, F. C., 144.
Nöller, W., 121.
Nott, A. H., 450.
Novello, F. *See* Finato & Novello.
Nuttall, G. H. F. *See* Hadwen & Nuttall.
Nyasaland Protectorate, 21, 418.

O.

Obregia, A., & Pitulesco, 311.
O'Brien, J. W., 374.
Oehler, R. 539.
O'Farrell, W. R., 123.
——. *See* Chalmers & O'Farrell.
Ogawa, M., 46.
Ohira, T., 299.
Orenstein, A. J., 150, 380.
Orticoni, A., 71.
—— & Sartory, A., 106.
Ostrom, H., 294.
Otis, E. F., 228.
Ouftugeaninoff, M., 565.
Ouzilleau, 104.

P.

Padesca, A., 141.
Paldrock, A., 187.

Pappenheim, A., 129.
Parker, H. B., 321.
Parparcone, E., 172.
Parrot, L. M., 53.
De Passos Maia, D. *See* Maia.
Patterson, J. F., 48.
Patton, W. S., & Cragg, F. W., 445.
Pauron, M. *See* Dopter & Pauron.
Pautrier, L. M., 497.
Pearson, R. W. J., 307.
Pedrosa, A. M., 557.
Pedroso, A. *See* Brumpt & Pedroso.
Peiper, O., 496.
Pelletier, J. *See* Thiroux & Pelletier.
Penfold, W. J., & Violle, 480.
Pepe, T., 50.
Pepin, J., 454.
Perry, 353.
—— E. L. *See* Ross, Christophers & Perry.
Perthuisot, 397.
Pflugradt, R., 298.
Philip, M., 367.
——. *See* Castellani & Philip.
Phillips, L., 68, 454.
Pickels, A. *See* Nigeria, Southern.
Pinoy, E., 238.
Pittaluga, G., 544.
Pitulesco. *See* Obregia, A., & Pitulesco.
Pixell, H. L. M., 127.
Plantier, A. *See* Sergent, Edm. & Et, Béguet & Plantier.
Plate, L., 521.
Plisson, L., *See* Baur & Plisson.
Pollock, L. J. *See* Singer & Pollock.
Pons, C. *See* Rodhain, Pons, Vandenbranden & Bequaert.
Porter, A. *See* Fantham & Porter.
—— H. E. B. *See* Bruce-Porter.
Potter, T. J., 322.
Poumayrac, 298.
Prentice, G., 246.
Price, G. B., 220.
—— J. D., & Rogers, L., 363, 552.
Pricolo, A., 102.
Priest, R. C., 321.
Priestly, H., 200.
Primet, 418.
Pringault, E., 44, 169, 554.
Propaganda Antimalarica, 256.
Puntoni, V., 114.

Q.

Quénu & Degrais, 56.

R.

Radloff, 242.
Railliet, G., 291.
Rainsford, F. E., 307.
von Rátz, S., 124.
Rauenbusch, 317.
Ravenhill, T. H., 281.
Razafimpanilo. *See* Fontoynont & Razafimpanilo.
Reid, R., & Calwell, W., 306.
—— D. Mc K., 85.
Reinhold, C. H., 266.
Rho, F., 509.
Rice, T. C., 377.
Richter, H., 321.
Rieley, S. D., & Howlett, F. M., 273.
Ringenbach, J., 35, 512.
Rivas, D. *See* Smith, Lynch & Rivas.
Rivista Pellagrologica Italiana, 314.
Robertson, M., 419.
Rodenwaldt, E., 91, 102, 281, 315.
Rodgers, R. T., 90.
Rodhain, J., Pons C., Vandenbranden, F., & Bequaert, J., 3, 120.
Rogers, L., 89, 326, 450, 465, 507.
——. *See* Price & Rogers.
—— W., 99.
Rondoni, P., 312.
Rosenthal, F., 472.
Rosier, C., 454.
Ross, G. A. P., 59.
—— P. H. *See* East Africa Protectorate.
—— R., Christophers, S. R., & Perry, E. L., 259.
—— W. C., 469.
Rossi, G., 158, 437.
Rost, E. R., 499.
Rotky, K., 112, 481.
Roubaud, E., & Lafont, A., 244.
Row, R., 560.
Rowland, E. D. *See* British Guiana.
—— S., 205, 206.
Rubino, G., 49.
Ruge, 56.
Russell, H., 61.
Rutherford, W. J. *See* Dick & Rutherford.
Ryan, J. C., 392.

S.

Sabella, P., 235, 471.
Sacquépée, & Garcin, 203.
Sadikoff, I., 198.
St. Leede, C., 95.
St. Lucia. *See* Windward Islands.
Salomon, E. *See* Leboeuf & Salomon.
Salvatore, D., 550.
—— *see* Natale Salvatore.
Sambuc, E., & Baujean R., 286.
Sandes, J. D., 450.
Sangiorgi., G., 212, 519.
Sanquirico, 203.
Sant'Ana, J. F., 166, 171.
Sarrailhé, A., 520.
Sartory, A. *See* Orticoni & Sartory, A.
Sauvet, C. *See* Leger & Sauvet.

Savage, A. H. *See* Willmore & Savage.
Schaumann, H., 323.
Scherschmidt, A., 242.
Schilling, C., 25, 415.
Schilling-Torgau, V., 525, 567.
Schmitter, F., 493.
Schochet, S. S. *See* Wellman, Eustis & Schochet.
Schokhor, N. J. *See* Yakimoff & Schokhor.
Schüffner, W., 394.
Schulhof, K., 129, 525.
Schultz, N., 100.
Schürmann, W. *See* Kolle, Hartoch & Schürmann.
Scott, H. H., 226.
—— L. B., 192.
Seal, C.B., 450.
Seguin, 454.
Seidelin, H., 184.
Séjournant, J., 210.
Sellards, A. W. *See* Strong, Tyzzer, Brues, Sellards & Gastiaburu.
——. *See* Walker & Sellards.
Sergent, Edm., 2.
—— & Et., Béguet, M., & Plantier A., 50, 58.
—— Foley, H., & Vialatte, C., 563.
——. *See* Lemaire, Sergent, & Lhéritier.
—— Et. *See* Sergent, Edm. & Et., Béguet & Plantier.
Seyderhelm R. *See* Uhlenhuth & Seyderhelm.
Sheard, Jr., C., 55.
Shilston, A. W., 38.
Shircore, J. O., 427.
Siegel, E., 89.
Sierra Leone, 243, 335, 383.
Siler, J. F. Garrison, P. E., & MacNeal, W. J., 303.
Da Silva, P., 547.
De Silva, W. T. *See* James, S. P. & De Silva.
Simon. *See* Fülleborn & Simon.
Simpson, F., 208.
—— J. J., 262.
—— R. J. S., 220.
Singer, H. D., & Pollock, L. J., 308.
Sitsen, A. E., 69.
Small, R. *See* East Africa Protectorate.
Smallman, A. B., 137.
Smith, J. E., 237.
—— A. J., Lynch, K. M., & Rivas D., 187.
—— C. H., & Graham, G. F., 8.
—— P. W. Bassett. *See* Bassett-Smith.
Soerensen, N., 444.
Soper, W. B., 13.
Sozzi, L., 308.
Spagnolio, G., 258.
Spittel, R. L., 72.
Splendore, A., 237.
Spolverini, L. M., 134.
Spurgin, W. H., 307.
Stamm, J., 477.
Stannus, H. S., 301.
Stanton, A. T., *See* Fraser & Stanton.
Statham, J. C. B., & Butler, G. G., 137.
Steen, R., & Townsend, R. S., 7.
de Stefano, S. *See* Lo Re & de Stefano.
Stefansky, V., 399.
Stefko, W., 103.
Stephens, J. W. W., 161, 432.
Stévenel, L. *See* Noc & Stévenel.
Stevenson, S. E., 283.
—— W. D. H., 268.
Stiles, C. W., & Keister, W. S., 92.
Stolowsky, 174.
Strachan, H., 234.
Strisower, R., 473.
Strong, R. P., Tyzzer, E. E. Brues, C. T., Sellards, A. W., & Gastiaburu, J. C., 142.
Stumpf, J. 476.
Suldey, E. W., 317, 442.
Summa, 148, 213.
Surveyor, N. F., 279.
Sutton, R. L., 238.
Suzuki, M. *See* Miyairi & Suzuki.
Swellengrebel, N. H., 296.
——. *See* Kuenen & Swellengrebel.
Swift, H. F., & Ellis, A. W. M., 402.

T.

Tanon. *See* Martel, Tanon & Chrètien.
——. *See* Mouneyrat, Tanon & Dupont.
Tarasconi, L., 437.
Taylor, A. S., 103.
——, H. B., 12.
——, L., 340.
Teague, O., 202.
Teichmann, E., 421.
——. *See* Braun & Teichmann.
Teisser, P., 464.
Terra, F., 498.
Thiroux, A., & Pelletier, J., 243.
Thomas, H., 381.
Thompson, H. N., 58.
Thomson, D., 499.
Thurston, E. O., 450.
Tirumurti, T. S., 299.
Tissier & Brumpt, 51.
Todd, J. L., & Wolbach, S. B., 404.
Torres, M., 175.
Townsend, R. S. *See* Steen & Townsend.
Toyoda, H., 398.
Trautmann, R., 424.

Travassos, L. *See* Gomes de Faria & Travassos.
Tuck, G. L. *See* Wu Lien Teh.
Tucker, B. R., 307.
Tuffier, 71.
Tulloch, W. J., 209.
Turkhud, D. A., 195, 317, 372.
Turner, J. A., 471.
Tyzzer, E. E. *See* Strong, Tyzzer, Brues, Sellards, & Gastiaburu.

U.

Uganda Protectorate, 342, 383.
Uhlenhuth, P., & Hügel, G., 400.
—— & Seyderhelm, R., 413.
Ujihara, K., 447.
United States Army, 362.
—— Public Health Reports. 365.
Unna, jun., P., 196.

V.

Van den Branden, F., 167.
——. *See* Rodhain, Pons, Vandenbranden & Bequaert.
Vedder, E. B., 320, 332, 449.
Velez, 142.
Vergne, R., 280.
de Verteuil, F. A., 192.
——, F. L., 196.
Vervoort, H., 297.
Vialatte, C. *See* Foley, Vialatte & Adde.
——. *See* Sergent, Foley & Vialatte.
Vickery, D. H., 297.
Villaça, H., 36.
Violle, H. *See* Penfold & Violle.
Visentini, A., 121, 139.
Viogt, L., 346.
Volpi-Ghirardini, G., & Zuccari, G., 313.
Volpino, 312.
——, G., & Bordoni, E. F., 312.

W.

Wade, W. M., 164.
Wagner, J., 454.
Wagon, P., 142, 558.
Walker, E. A., 370.
——, E. L., 466.
—— & Sellards, A. W., 63.
——, J., 126.
——. *See* Couret & Walker.
Wall, F., 62, 266.
von Wasielewski, T., 517.
Watanobe, R., 293.
Watson, E. A., 536.
——, M., 153, 260.
——, F. C. *See* Noland & Watson.
Webb, S., 353.
Webb, V. C. .454.
Weck, 242, 417.
Weinstein, H., 240.
Weiss, E., 302.
Welcker, A., 110.
Wellman C., Eustis, A. & Schochet, S. S., 213.
Weltmann, O. *See* v. Konschegg & Weltmann.
Wenyon, C. M., 76, 543, 550.
Werner, H., 258, 412, 454.
——. *See* Giemsa & Werner.
——. *See* Mayer & Werner.
Wheeler, G. W., 456.
Wherry, W. B., 78.
Whipham, T. R., 545.
White, H., 290.
——, C. J., 197.
——, P. C., 266.
Whitmore, A., 450.
——, E. R., 76.
Wiener, E., 239.
Williams, A. W., 497.
—— & Calkins, G. N., 79.
Willmore, J. G., & Savage, A. H., 81.
Wilson, S. A. K., 309.
Windward Islands (St. Lucia), 241.
Winn, C. M., 455.
Winocouroff, J., 12.
Wise, K. S., & Minett, E. P., 236.
Wohl, M. G., 274.
Wolbach, S. B., 399, 518.
—— & Binger, C. A. L., 405.
—— & Honeij, J. A., 501.
——. *See* Todd & Wolbach.
Wood, E. J., 304.
Woodcock, H. M., 517.
—— & Lapage, G., 515.
Woods, F. L., 292.
Woolley, P. G., 502.
Woosnam, R. B., 428.
Wu Lien Teh [G. L. Tuck], 202.

Y.

Yakimoff, V. L., & Schokhor, N. I., 556.
Yeomans, F. C., 454.
Yokogawa, S., 288.
Yorke, W., & Blacklock, B., 428, 532, 534.
——. *See* Barratt & Yorke.
——. *See* Blacklock & Yorke.

Z.

Zambaco Pacha, D. A., 497, 508.
Ziemann, H., 230, 232, 260, 431.
Zirolia, G., 108.
Zuccari, G. *See* Volpi-Ghirardini & Zuccari.

INDEX OF SUBJECTS.

Ainhum *see under* **SKIN DISEASES, Tropical**

AMOEBIASIS (Amoebic Dysentery, Liver Abscess, and Spleen Abscess, *see also* **DYSENTERY**), 63–81, 447–57
- Amoebic Dysentery 63–81, 447–51
  - Abscesses in, *see* Liver, *and* Spleen
  - Alcoholism and, 451
  - Amoebae
    - Classification, 74–5
    - Cultivation, 63 *et sqq.*, 79–80
    - and Cysts, resistance to reagents, 76
    - of Man, 76
      - Cultivation, 77
      - Morphology, 76, 77, 78
    - Morphology, 74–8
      - Changes in from.
        - Bismuth Subnitrate, 455
        - Emetine, 455
        - Salvarsan, 455
    - Non-pathogenic from *Macacus rhesus*, 457
    - Pathogenic, Japan and China, 456–7
      - Action on, of various drugs, 454–5
  - *A. limax*, cultivation, 67
    - Type of, present in, 75
  - *A. tetragena*, *see E. tetragena*
  - *Craigia hominis* sp., Morphology, 75
  - Entamoeba genus, morphology of, 75
  - Entamoebae
    - Black diarrhoea due to, 67
    - Cultural, variations in and in cysts of, 79–80
    - Cysts of, action on, of Emetine and other reagents, 76
    - Degenerative phenomena of, 77
    - of Monkeys, 80–1
    - Nuclei of, 77

Amoebiasis—*cont.*
- Amoebic Dysentery—*cont.*
  - Amoebae—*cont.*
    - *Entamoeba coli*. 65, 79
      - Cysts of, 76
      - Differentiation from *E. tetragena*, 77
      - Feeding experiments with, 64
      - Incultivable on artificial media, 457
      - in Man, 77
        - Healthy, 467
      - Morphology, 76
      - in Stools, indication of food contamination, 92
      - One akin to, in Monkeys, 80, 467
      - Variations in, 76, 79–80
    - *E. duboscqi*, 81
    - *E. dysenteriae*, use of term urged, 457
    - *E. histolytica*, action on, of Emetine, 449
      - Aetiological significance, 65
      - Alone found, in Korean cases, 67
      - Bionomics and vitality, 456
      - Carriers, 448
      - Cysts of, viability, 448
      - and *E. tetragena*, differentiation of, 65, 66, 457
      - Feeding experiments with, 64–6
      - Forms resembling, in Monkeys, 81
    - *E. legeri*, 81
    - *E. nipponica*, 77–8
    - *E. phagocytoides* morphology and cultivation, 78
    - *E. tetragena*, 447
      - Biform, in Formosa, 447
      - Cysts of, 76
        - Action on, of certain solvents, 447
      - Differential diagnosis, 78
      - Differentation from *E. histolytica*, 65, 66, 457
      - in Feeding experiments, 64-6

Amoebias—*cont.*
AMOEBIC DYSENTRY—*cont.*
Amoebae—*cont.*
E. tetragena—*cont.*
Incultivable on artificial media, 457
Modes of division, 456
Morphology, 76
One resembling, from Amoebic cystitis, 157
Parasites associated with, Senegal, 66-7
Pathogenicity, 77, 78
E. undulans, 77
E. williamsi, 76
Nagleria genus, *punctata* sp., morphology, 75
Paramoeba genus, *eilhardi* sp., morphology, 75
Trimastigamoeba philippinensis sp., morphology, 75
Vahlkampfia limax sp., 79
Biology, 78
Morphology, 75
in Water, U.S.A., 78
Amoebic Cystitis, 457
Amoebicidal action of Emetine, *see* Emetine *under* Treatment, *below*
Bile, action of, on *E. tetragena* cysts, 447
Bladder, amoebic infection of, 457
Blood conditions and changes in, E. Asia, 67, 76, 77
Cephaelin, action of, on Paramoecium, 452
Chief agents of, various views on, 66
Complications in, 69, *see also* 570
Diagnosis by
Examination of blood-stained mucus in stools, 76, 77
X-rays, 72
in Dog, naturally acquired, 456
Drugs, &c., used in, *see under* Treatment
Experimental, 63–6
Hepatitis, *see under* Liver Abscess
Incidence
Asia, Eastern, 77
British Isles, 66
China, 67, 78, 456, 457
Cochin-China, 452, 453, 454
Deli-Sumatra, 76
Dutch East Indies, 453
Formosa, 447
France, 66, 448–9
Germany, 66
India, 451–2, 453
Bengal, 252
Indo-China, 78, 452

Amoebiasis—*cont.*
AMOEBIC DYSENTRY—*cont.*
Incidence—*cont.*
Jamaica, 226
Japan, 77, 456
Korea, 67
Mauritius, 454
Morocco, 73
Panama Canal Zone, 447, 451, 455
Senegal, 66
Togoland, 91
Yucatan, 452
Infection, natural mode, 448
Lamblia spores, fly-borne, and, 92
Löschia, *see Entamoeba*
in Monkey, Non-pathogenic amoeba from, 457
Paramoecium, action on, of Cephaelin and Emetine hydrochlorides, 452
Prophylaxis, 66, 448
References to literature, vii-ix, xxxix–xli
Relapses in, 452
Transmission by
Dogs and cats (possible), 456
Flies, 92
Food, contaminated by human excreta, 92
Human carriers, 65, 448, 449
Treatment by
Bismuth subnitrate, 434–5
Chinosol, 463–4
Emetine, 66, 67, 71–4, 449–55
Ipecacuanha, 66, 449–55
Alkaloids, 452
De-emetinized, 74
Neo-salvarsan, 456
Oil of male fern, 447
Quinine, 447, 449, 455
with Tannin, 447
Salvarsan, 455
Silver nitrate, 449
Sour milk, 74
Tannin, with Quinine, 447
Thymol, 447
Trypsin, 447
Uzarà, de-emetinized, ipecacuanha and sour milk, 74
Trichomonas and, 92
Trophozoites, in early lesions (dog), 456
Trypsin, action of, on *E. tetragena* cysts, 447

LIVER ABSCESS, 68–74, 450, 454, 464
Alcoholism and, 451
in Experimental, 464
Cerebral abscess subsequent to, 68, 69
Coccus in cultivation from, 69

Amoebiasis—*cont.*
LIVER ABSCESS—*cont.*
Diagnosis by X rays, 71
Diagnostic signs, 70
in Epigastrium, 71
Hepatitis in, Emetine for, 450, 451
Incidence:—
Age, sex and caste, 451
Geographical
France, 449
India, 451
Korea, 67
Russia (Baku), 464
Multiple, 70–1
Opening into, and through, the lung, 68, 70, 73, 74
Opening into stomach, 70
Treatment by
Aspiration, 450, 451, 452
Emetine, 68, 70, 71 *et sqq.*, 451, 452
Ipecacuanha, 68, 70
Surgery, 68, 70, 73, 450, 451

SPLEEN ABSCESS, treatment by aspiration, 451

BERIBERI, 319–24, 332.
Correction, 324
Experimental, histopathological changes in central nervous system of pigeons with, 321
Treatment, by phosphorus compounds &c., 323
Incidence:—
Malaya, 320
Sierra Leone 336
on Ship-board, 320
Zanzibar, 301
Jail oedema, identified with, 321
Neuritis:—
Epidemic, in Central Africa, 322
Peripheral in Jamaica, 322
Multiple, in European soldiers in India, 321–2
Reference to literature, ix, xli
Symptoms, 321, 322
Treatment by
Extract of rice polishings, 319
Phosphorus compounds, &c., 323
Vitamines (Funk's theory), discussed, 323, 331

Bilharzia, *see* **Schistosomiasis** *under* **HELMINTHIASIS**

Biting Arthropods, *see under* **INSECT TRANSMITTERS OF DISEASE**
References to literature, xxxvi–vii, lxxvii

BLACKWATER FEVER, 161–3, 261, 443–4
Anophelines and, 163
Etiology, 161, 162, 163
Experimental research on, 163, 261, 444
Haemoglobinaemia, production of symptoms in, 261
Haemolytic action of quinine in experiment on, 444
Incidence:—
Angola, 163
China, 434
Indo-China 433
Jamaica, 226
Nigeria, Southern, 333
Panama region, 162
Sierra Leone 335
Sunda Islands, 444
Tonkin, 443–4
Uganda 342
West Africa, 261
Malarial infection in relation to, 161–2
Pathogenicity of, experiments on Rabbits, 444
Prophylaxis, 162, 443,–4
References to literature, ix–x, xliii
Symptoms, general, production of, 261
Syphilis as suggested cause of, 162–3
Transmission by mosquitoes (*A. costalis*), 163
Treatment by
Salines
Enemata, 261
Normal saline injections, 261
Salvarsan, 163
Urobilin test for, 444

Buttocks. Fistulous Disease of *see under* **MISCELLANEOUS**

CHOLERA, 105–16, 469–90
Acute cholera-like attacks, amoeba and protozoon in, 489
Aetiology, 105–6
Anti-agressin immunity, how produced, 481
Bacteriological examinations in, 470, 471
Bacteriology, 106 *et sqq.*, 477
Report on, of Bombay Laboratory (1912), 112

Cholera—*cont.*
Bacteriology—*cont.*
Vibrio cholerae (comma bacillus) action on, of
Pot. permanganate, 361
Vinegar, 107
Agglutinability of, from Gall-bladders of the Dead, 478
Agglutination of different strains, magnesium sulphate and, 479–80
Salt and Serum, likenesses and differences, 480
Spontaneous, 479
Results, after passage through water, 479
Tests, 106–7
Anti-agglutinants, 479
in Bile, 109, 479
from Bombay cases, cultural features, 484
Changes induced in, in water, 113, 471, 479
Cultivation of, 108–9, 111–12, 473, 474, 484
Dissemination of, in bodies of infected animals, 113
and El Tor vibrio, difference between, 480–1
in Faeces in diphtheria and scarlet fever, 482–3
in Gall-bladder, 109, 115
Haemo-digestivity of, 481
in Kidney, 479
in Lung, cultivation of, 479
Method of producing rapid and fatal intoxication with, 480
Non-agglutinating, changed by culture to agglutinating, 484
Persistence of, in the healthy, *see* Carriers
from Spanish patients and from river of region, 483
in Urine, 109
Vitality outside human body, 477, 478
Deneke's, 109
El Tor vibrio, experimental immunization against, 112–3, 481
Haemolytic character of, 481
Immunization against, 112–3
and *V. cholerae*, differences between, 480–1
Paracholera vibrios in shellfish, 481–2
Vibrio Jamboli D.M., 310, biological characters of, 484–5

Cholera—*cont.*
Bacteriology—*cont.*
in Faeces—*cont.*
Vibrios resembling, in Children, 482–3
and Pigment forming, 481
Blood conditions in, 473, 489
Blood picture in, as diagnostic aid, 473
Carriers, (*see also under* Transmission), 114–6
Antibodies in blood of, 116
Chronicity of, lessened by Pot. permanganate, 474
Classification of, 115, 116
Case clinically resembling, 108–9
Coma of, Sod. bicarb. solution for, 473
Conservancy in relation to, 469, 486, 487
Convalescence, clinical signs of, 473
Death rates
Balkan War area, 472
Vaccinated and other, 474–7
India, 469.
Diagnosis by blood picture, 473
Dieudonné's medium, 473; selective value, 111–2
Disinfection, *see also* Prophylaxis
of Water, and faeces by
Cyllin, 486
Lime, 470
Chlorinated, 487
Pot. permanganate, 487
Epidemiology, 107, 108, 114, 469, 470, 472 *et sqq.*, 486–7
Canstatt's experiences in, 490
Experimental, in
Guinea pigs, 485–6
Monkeys, 490
Gangrene as correlated with, during Balkan war, 110–11
Guinea pigs with, experimental, 485–6
Hydrochloric acid, dilution by, of drinking water as precaution in, 487
Immunisation experiments with El Tor vibrio, 112–13, 481
Incidence, geographical
America U.S. (New York), 470–1, 481
Arabia, 469
Austria (Vienna), 108
Balkan War area, 110–11, 472 *et sqq.*, 476, 484–5
Belgium (Brussels), 490
China, 111, 469
Dutch East Indies, 469
Egypt, 112–3, 469, 480–1

Cholera—*cont.*
Incidence, geographical—*cont.*
France, 115, 481–2
Paris, 490
French India, 107–8, 469
Galicia, 470
Germany, 115
Holland, 115
Hungary, 470
India, 111, 114
Benares, 486
Bengal, 359, 469, 488
Calcutta, 469
Bombay, 361, 471, 484, 487
Deccan, 487
Madras, 353
Puri, hospital, 114
Jail, 486
United Provinces, 360
Indo-China, 469
Italy, 108, 115
Japan, 469
Malay States, 469
Philippine Islands, 115, 469
Porto Rico, 228
Russia, 105, 115
Siam, 469
Spain, 483
Tunis, 406
Turkey, 105, 110, 469
Seasonal, 107, 469
Indian districts with organisation against, 353 *et sqq.*
Isolation in (*see also* Prophylaxis), 470, 471, 473
Kidney changes in, 489
Laboratory value in, of Dieudonné's medium, 111–2
Liver changes in, 489
Medical relief in (India), 357
Monkey infected by mouth with *V. cholerae*, 490
Mortality from, in relation to tropical temperatures, 114
Nitrites and nitrous acid as toxic agents in, 105–6
Organisation against in India, 353 *et sqq.*
Pathological anatomy, some cases, 488–9
Histology of central nervous system in, 489
Pipe-water in relation to, 486
Pneumonia of, 472
Bacterial explanation, 479
Podophylin *plus* cholera culture as affecting guinea-pigs, 485–6
Polymorphonuclear leucocytosis in, 473
Post-mortem findings in, 472, 479
Cholera—*cont.*
Pot. permanganate in water disinfection, 361, 487
Prophylaxis, 107–8, 111, 469, 470, 471, 473, 482, 486–8
Organisation for
Bengal, 359
Bombay, 361
Madras, Presidency, 353
United Provinces, 360
Personal (Servia), 473
References to literature, x-xi, xliii-v
Regulations for dealing with epidemics in United Provinces, India, 487
Septicaemic character, occasional, of, 479
Serum agglutination in convalescence, 470
Reactions of cholera-like vibrio from children 482–3
Shell fish, paracholera, vibrios in, 481–2
Ship-borne 115, 470–1, 481
Skin conditions in, 471–2
Sign in 448–9
Symptoms, 470 *et sqq.*
Toxic agents in, 105–6
Toxin of, action of, on animal intestines, under moist heat, 114
Action on, of Pot. permanganate, 475
Transmission various modes of
Bad conservancy 469, 486, 487
Carriers and contact, 106, 107, 114-6, 357, 469, 470, 471, 473 481, 487
Climate, 469
Contamination of food and drink, 105, 469, 471, 473, 474
Crowds, 469, 486
Flies, 301 469, 486, 487
Sea-travel, 115, 470–1, 481
Water (*q. v.*), 108
Treatment (*see also* Medical Aid) by
Adrenalin, 473
Anti-cholera serum (Kolle's), 474, 475
Caffeine, 107
Calcium permanganate, 111
Camphor, 473
Oil, 107
Colloidal transport of medicaments, 476
Digitalis, 473
Iodine, 474
Tincture of, 475
Magnesium chloride and methylene blue, injections of, colloidal complex of, 476
Opium, 474
Pituitary extract, 488

Cholera—*cont.*
Treatment—*cont.*
Pot. permanganate, 106, 111, 474, 475
Quinine, 474
Saline solution, 473, 490
Hypertonic, 106, 111, 474, 475–6, 488
Normal, 106, 107
Sod. bicarbonate solution, 473
Sod. permanganate, 107
Sparteine, 107
Sublimate, with magnesium chloride and methylene blue, colloidal complex, 476
Ton. aluminium silicate, 476
Vaccination, 473
Kolle's vaccine, 474–5
"Wholesale," 111
Water supplies in relation to, 108, 111, 471, 474, 486, 487, 488
Disinfection by
Lime, 470, 488
Pot. permanganate, 487

DENGUE, and Unclassed Fevers (*see also* **FEVERS, UNCLASSED** 328–30
Clinical course, 329
Epidemics of, Incidence
Indo-China, 326
Sicily, 328
Syria, 328
Malaria-like fevers of uncertain origin in New Caledonia, 329
Splenomegaly in, 329,
Treatment
Neosalvarsan, 329
Quinine, 329
Prophylaxis, 329
References to literature, xi–xiii, xlvii.
Supra-renal insufficiency in, 328
Treatment by adrenalin, *ib.*
Symptoms, 328, 329
Transmission, by Pappataci flies, 329

Digestive System, Diseases of, Uganda, 342

DISEASE PREVENTION (*see also* Prophylaxis, *under each* Disease), 353 *et sqq.*

Dracontiasis, *see* **FILARIASIS** (DRACONTIASIS)

DYSENTERY (Bacillary, Ciliate, or Balantidial, Flagellate, and Unclassed, *see also* AMOEBIC, *under* **AMOEBIASIS**), 81–94, 458–68

Dysentery—*cont.*

BACILLARY, 81–90, 458–61
Agglutination tests, 459
Agglutinins in serum of patients with, 81, 85, 88–9
in Asylums, bacteriology of, 84–6
Bacilli of, bactericidal action on, of antiseptics, 90
Fermentation by, of sugars, 85–6
Serum-fast strains of, 86
dysenteriae action on, of organic silver salts, &c., 89–90
Flexner, 378, 459, 460
Agglutinins for, persistence of, 88, 89
Bacilli resembling, 85
Shiga, 84, 91, 378, 459, 460, 461–2
Agglutinins for, persistence of, 88
faecalis alkaligenes, in asylum cases, 85
Morgan, No. 1, 378, 460
proteus, in asylum cases, 85
pseudo-dysenteriae, Kruse, 458
pyocyaneus in asylum cases, 85
Shiga-Kruse, 86, 87
Non-viability of, 86
Tor, 81,
Y. Bacillus, 438
Diagnosis, bacteriological, 84
Diagnostic errors regarding, Calcutta, 326
Epidemiology, 81–4, 86–7, 378, 458–9
Formic acid, antiseptic nature of, 460
Incidence
Geographical
Austria, 86–7
Cochin-China, 460
Egypt, 82, 83
England, 459
Germany
Alsace, 458
Frankfort, 458
Heidelberg, 459
Würtemberg, 458
India, 90–1, 362, 378, 460
Indo-China, 83–4
Italy, 458–9
Jamaica, 226
Nigeria, Southern, 333
Togoland, 459
Tripoli, 459
in Jails (India), 90–1, 378
in Pilgrims returning from Mecca, 81–2
Seasonal, 90, 378–9

Dysentery—*cont.*
BACILLARY—*cont.*
Mortality-rate, pilgrim, in Egypt (1907–13), 82, 83
Prophylaxis, 90–1
References to literature, xi–xii, xlvi
Symptoms, 84 *et passim*
Toxaemic arthritis as complication of acute, 460–1
Transmission by
Ants (possible), experiments on, 459–60
Human carriers, 84, 86–7, 458, 459
Laundries, 89
Water-pollution, 459
Treatment by
Diet, 89
Emetine, 82, 449, 460
Magnesium sulphate, 460
Serum, 82, 83, 84, 87
Silver gelatose enemata, 89–90
Silver nitrate enemata, 91
Tannin enemata, 91
Vaccine, 90–1
Water enemata, plain or with tannin or silver nitrate, 91

CHRONIC, locale of lesions in, 90

Y-FORM, in breast-fed infants and young children, 89

BILHARZIAL, Senegal, 67

CILIATE (Balantidial), 92–4 466–8
Balantidium coli, 92
Allied forms, 93
Morphology 92–3
B. coli suis, and *B. coli hominis*, morphological identity, 467–8
B. giganteum, 93
B. minutum, 93
Experimental in
Cats, 93
Dogs, 93
Monkeys, 466–8
Pigs, 467–8
Incidence
Cochin-China, 94
Finland, 93
Germany, 92
Jamaica, 226
Philippine Islands, 467, 468
Russia, 93
Sweden, 93, 466
Tropics, 93
Prophylaxis, 468
Symptoms, 92, 93

Dysentery—*cont.*
CILIATE—*cont.*
Treatment by
Acetic and tannic acids, 93
Appendicostomy, 93
Emetine, 466
Iodine, 93
Ipecacuanha, deemetinized, 93
Quinine, 93
Salicylic acid, 93
Silver nitrate, 93
Thymol, 92, 93

FLAGELLATE, 465–6
Entamoeba coli in faeces, 466
in Jamaica, 226
Lamblia intestinalis in stools, action on, of Emetine, 466
Pathogenesis, 464–5
Tetramitidae, diarrhoea due to, 465–6
Difâmus tunensis, new genus and species, 466
Trichomonad, in faeces, morphology of, 466

UNCLASSED, or Mixed, 90–2, 461–5
Agglutination experiments, 463
Amoebae in Stools, 462, 463
Bacilli of
Shiga's, 461
One like, 463
Strong's, 461
Y, 461
Chronic, operation in, discussed, 91
Clinical history, 463
Differentiation and Treatment (*q.v.*), 465, *see also* 507
E. tetragena in stools in, 463
Entoplasma of (so-called), 464–5
Epidemiology, 461–2
Experimental, 463
Flies and, Shiga bacilli &c. in, 461–2
Incidence
Annam, 463
Cochin-China, 462
India (Bombay), 466
Tunis, 465–6
Protozoal Intestinal Parasite producing Dysenteric symptoms in man, 464–5
References to literature, xii–xiii, xlvi–vii
Resumé of present knowledge of, 90
Spirilla in Stools, 464
Transmission by Flies (house), 461–2

Dysentery—*cont.*
UNCLASSED—*cont.*
Treatment by
Calomel, 463
Chinosol, 463–4
Cyllin, 482
Emetine, 91
Ipecacuanha, 91, 463
Lister Institute polyvalent serum, 462
Opium, 91, 463
Ozone, 91
Salines, 462
Sodium salicylate, 463
Trichomonas in, 91

FILARIASIS, 96–104, 315–8
Chameleons with microfilariae in blood, Madagascar, 317
Chrysops dimidiata, and *C. silacea*, in relation to, 333
Dermococcus associated with lymphangitis, 316
Animal, in
Birds, 103
Camels, 102–3
Chameleons, 317
Filaria of, *see under* Filaria, below
Incidence
Madagascar, 317
Russia (European), 103
Tripoli, 102
Filaria and microfilaria of
Embryonic, differentiation of 102
Measurements of, 101
in Human Blood, 315, 316
Morphology, 97
New, embryo of, Togoland, 102
Stegomyia larvae, with guinea-worm larvae inside, 318
Stegomyia pseudo-scutellaris as host, 97
F. bancrofti
in Human blood 315, 316
in relation to Eosinophilia, in Algiers, 98
Geographical distribution, 96
Morphology, 101
Studies on, 96
F. demarquayi, 316
Embryo of, differentiation of, 100
F. diurna, differentiation of, 96
in Middle Congo, 98
F. loa, 315
in Algiers, 98
Cerebral complications and, 98–9
Embryos of, differentiation of, 100, 101
Eosinophilia and, 98

Filariasis—*cont.*
F. loa—*cont.*
in European cases, 99–100
Infection by, cases of, 317
Morphology, 101
Muscular abscesses and, 317
New filaria differing from, 102
Problems of, 96
F. nocturna, differentiation of, 96
F. perstans, in Algiers, 98
Embryos of, differentiation of, 100, 101, 102
Eosinophilia and, 98
F. haematica cameli, 102
in Middle Congo, 98
F. haematica cameli, 102
F. volvulus, and Elephantiasis, 96
Morphology, 101
Microfilaria nuda, in human blood, 315
Microfilariae in
Birds, 103
Chameleons, 317
Human
Blood conditions in
Eosinophilia in, 96, 98, 99
Filaria in, 315, 316
Morphology of, 97
Filarial embryo, new, in, 102
Onchocerca volvulus larvae in, 100–2
Incidence
Age and Sex, 97–8
Geographical
Algiers, 97, 98
America, U.S., 321
Argentina, 317
Barbados, 316
Congo, Belgian, 98
French, 96, 104
Gold Coast (British), 191
Great Britain, 99–100
Guadeloupe, 315
Jamaica, 226
Kamerun, 317
Lagos, 99
Malay States, 319
Martinique, 316
Nigeria, Southern, 99, 333
Russia (European), 100
St. Kitts, 316
Togoland, 102
Trinidad, 316
Uganda, 98
Lymphangitis in relation to, 97
in Martinique, 316
Lymphatic varicocele in, 136
Microfilaria of, 101
Measurements of, 101–2
Periodicity variations of, 96, 97

Filariasis—*cont.*
Human—*cont.*
Ocular, and its cause, 98–101, 315, 317
Symptoms, 96, 97–8, 99–100, 315, 316, 317
Transmission by
Chrysops dimidiata, 333
C. silacea, 333
Human carriers, 98
Insects, 97
Treatment by Salvarsan, 104
References to literature, xiii, xlviii.

DRACONTIASIS, 317–8
Alum in water against, 373
Blood conditions, mammalian, in, 318
Guinea worm
Larvae, intermediate hosts
Cyclops, 317–8, 372
Stegomyia larvae, 318, 372
Morphology, 372, 373
Incidence
Brazil, 327
India, 372
Prophylaxis, 372–4

ELEPHANTIASIS, 103–4
Filaria associated with, 96–7, 104
Incidence
British New Guinea, 96
China, 96
Congo, Belgian, 98
French, 96, 104
Fiji, 96, 97
Martinique, 316
Non-tropical regions, 96
References to literature, xiii, xlviii, xlix.
Treatment by
Operation, 96, 103–4
Salvarsan, 104

ONCHOCERCIASIS, 100–2
Onchocerca volvulus and, 104
Distribution,
Kamerun, 317
Middle Congo, 98
Embryos, 315
Larvae in lymph glands and circulation, 100–2
Morphology, 100–2

FEVERS, UNCLASSED (*see also* **DENGUE & UNCLASSED FEVERS**), 328–30
Fièvre boutonneuse, *see* Macular fever

Fevers, Unclassed—*cont.*
Macular fever
Incidence
Anglo-Egyptian Sudan, 330
South Africa, 330
Symptoms, 330
References to literature, xii–xiii, xlvii

Framboesia, *see* **YAWS**

Guinea Worm, *see* **FILARIASIS** (DRACONTIASIS)

HEAT STROKE, references to literature, l.

HELMINTHIASIS, 285–99
Anthelmintics, references to literature, xvi
B. anthracis, germs least resistant to bactericidal action of intestinal worms, 285
Bactericidal action of intestinal worms, 285
Bilharzia, *see* SCHISTOSOMIASIS, *below*
Entozoa on Australian fleas, 291
Forms of.
Hepatic and intestinal in China, 285
Intestinal, in Guadeloupe, 286
Giganthorhyncus, bactericidal action of, 285
Helminths, bactericidal action of, 285
References to literature, xiv–xvi, l–lii
Round worms, *see Ascaris lumbricoides*, under ASCARIASIS
Serum and tissue reactions, toxins, &c., references to literature, xv
Tape-worms, *see* Monstrosities in, *under* TAENIASIS
Thread-worm infection, *see Oxyuris vermicularis*, *under* OXYURIASIS
Trichuris ova in stools, Jamaica, 226

ANKYLOSTOMIASIS, 292–6
Ankylostoma and ova in
China, 285
Congo, 295
Jamaica, 226
A. caninum, experiments with, on dogs, 296
A. ceylanicum infection, India, 294
A. duodenale, 294
Blood conditions in, 292
Blood volume in, in dogs, 296

Helminthiasis—*cont.*
ANKYLOSTOMIASIS—*cont.*
Incidence
Class, 292–3
Geographical
America, South, 227. 295, U.S., 294
Brazil, 227, 295
British Guiana, 350, 351
China, 285, 292
Congo, 295
Belgian, 294–5
Costa Rica, 295
Guadeloupe, 286
India (Bengal), 293–4
Italy, 295
Jamaica, 226
Japan, 293
Nigeria, Southern, 226
Philippine Islands, 295
San Thomè Island, 294
Sex, 292, 295
Necator americanus infection
India, 294
Japan, 293
Prophylaxis, 292
References to literature, xiv-xv, l–li
Symptoms, 292
Treatment by
β naphthol, 292
with Phenol-phthalein, 295, 396
Chloroform mixture, 292
Ethereal oil of male fern, and thymol, 292
Eucalyptus-chloroform mixture, 293
Eucalyptus oil, 292
Filix mas, 292, 296
Ol. chenopodii anthelmintici, 297
Santonin and calomel, 292
Sodium sulphate, brandy, and thymol, 293
Sulphur, 292
Tannate of pelletierine, 292
Thymol, 292

ASCARIASIS, 296–9
Ascarides in bile ducts, 298–9
Ascaris embryos, development of, outside the human body, 296
Ascaris stage, resembling *Strongyloides stercoralis*, 296–7
Ascaris in stools
China, 285
Guadeloupe, 286
Jamaica, 226
A. lumbricoides, death due to, 298
Voided per mouth, 298
Wandering habits of, 299

Helminthiasis—*cont.*
ASCARIASIS—*cont.*
Incidence
Annam, 298
Congo, 295
Guadeloupe, 286
Jamaica, 226
Japan, 299
Intestinal obstruction due to, 297, 298
References to literature, xv, li
Severe case: treatment, 298
Symptoms, 297, 298, 299
Treatment by
American worm seed oil (*ol. chenopodii anthelmintici*), 297 & *n.*, 298
Caffeine, 298
Castor oil, 297, 298
Quinine, 298
Santonin, 298
Thymol, 297

DISTOMIASIS, *see under* TREMATODE INFECTIONS

DRACONTIASIS, *see under* **FILARIASIS**

ELEPHANTIASIS, *see under* **FILARIASIS**

FILARIASIS *see* **FILARIASIS**

OXYURIASIS
Oxyuris in Stools, China, 285
O. vermicularis, 294
References to literature, xv

SCHISTOSOMIASIS (Bilharzia)
Blood conditions in, 289, 290, 291
Incidence
Asia, 290
Guadeloupe, 288
India, 289
Japan, 290–1
Sudan, 289
References to literature, xiv, l
Schistosomiasis, Intestinal, Sudan, symptoms, 289
Japonica, symptoms, 290–1
Experimental, 290
Natural, 290–1
S. haematobium, 289, 290
S. japonicum, 288, 291
Biology and morphology, 290
Development 289–90
Snails as intermediate hosts of, 290
S. mansoni, 288, 289
Treatment by autogenous vaccine of coli-like organisms, 289

Helminthiasis—*cont.*
STRONGYLIDAE 299
Bactericidal action of, 285
Strongyloides infection, Congo, 295
S. stercoralis, diagnostic points, 299
Pathogenicity of, 299

TAENIASIS, 291
Bothriocephalus, case of, in France, 291
C. fasciatus, with *Hymenolepis* cysts, 291
Hymenolepis diminuta cysts, in fleas, 291
Hymenolepis murina cysts, in fleas, 291
Monstrosities in tape-worms, 291
Rat fleas, with *Hymenolepis* cysts, 291
References to literature (Intestinal) xiv (Intestinal and Somatic), l
Taenia, bactericidal action of, 285
T. saginata, with Y-shaped proglottides, 291
T. cheopis, with *Hymenolepis* cysts, 291
Treatment by ethereal extract of male fern, 291

TREMATODE INFECTIONS, 286–91
Cachexie aqueuse in sheep, 287
Clonorchis sinensis, 287
Distoma pulmonum, pulmonary haemorrhage due to, 287
Distomiasis, hepato-pancreatic, Tonkin, 286–7
References to literature, xiv
Sheep-sickness resembling, 287
Fasciola hepatica, in sheep, disease due to, 287
Fasciolopsis, 287
Haemoptysis, endemic in Yucatan, 287
Treatment, 287
Metagonimus yokogawai, biology of, 288
Paragonimus westermani, *see Distoma pulmonum*, *above*
New form in man, with trout as intermediate host, Formosa &c., 288
Trematodes in North Queensland, 287
References to literature, xiv, l

TRICHINELLIASIS, references to literature, xv, li

Helminthiasis—*cont.*
TRICOCEPHALIASIS, references to literature, xv, li
Tricocephalus in stools
China, 285
Congo, 295
Guadeloupe, 286
Jamaica, 226

HYGIENE, APPLIED, in the Tropics, 333 *et sqq.*
Anti-typhoid Inoculation in three Armies serving in the Tropics, 362–3
British Guiana, 349–51
Diseases prevalent, 350
Ceylon, Anti-Stegomyia Campaign in, 349
Conservancy, 349
Drainage, 348
Malaria incidence
Rural, 346–8
Urban, 348
Water supply, 348–9
Colonial Office Anti-malarial Information Forms, 351–2
Conservancy, see also Reports, *and* Waste
Incinerators, "Griffith," Madras city, 385-6
Small, Jamaica, 384
Disease Prevention, *see also* Prophylaxis, *under each* Disease
by Bats, 380
,, Crude carbolic acid, 380
,, Insect destruction, by Traps, &c., 377–9
,, Larvae destruction, by Fish, 381
,, Vaccination, 374–7
of Cholera, 353 *et sqq.*
,, Guinea Worm, 371–4
,, Kala Azar, 363–5
,, Malaria, 353–4, 381
,, Small-pox, 374–6
,, Typhoid Fever, 362
,, Yellow Fever, 365–6
Nigeria, Southern, 333–5
Anti-malarial measures, 335
Conservancy, 334
Death-rates, European, General and Infantile, 333
Diseases prevalent, 333
Prison Hygiene, 334–5
Sanitary Works, 334
Yellow fever, 335
References to literature, lxxx.
Sanitary Legislation
Larvae Cases, 383
Plague Prevention, Vital Statistics in, 383
Rulings, Uganda, and Sierra Leone, 383

Hygiene, Applied—*cont.*
Sanitary Measures
Incinerators, "Griffith," Madras City, 385–6
Small, Jamaica, 384
Sierra Leone, 335 *et sqq.*
Anti-malarial measures in, at Freetown, 336–42
Conservancy, 336
Diseases prevalent, 335–6
Drainage, 336, 340
Sanitary measures, 336, 383
Uganda, 342–6
Conservancy, 343, 345
Diseases prevalent, 342 *et sqq.*
Sanitary measures, 346, 383
Vaccines, Preserved Vaccine for, 345–6
Waste, Treatment of, 384–6
Water supplies and projects
Madras, 389–91
Infiltration galleries, 389
Mandalay, 387–8
"To meet changing views," 387–9

INSECT TRANSMITTERS OF DISEASE (*see also under each* Disease so Transmitted), 262–5
Anophelines, of B. W. Africa (*A. costalis*, and *A. funestus*), 262
Ants, Panama Canal Zone, micro-organisms transmitted by, 264
Bed-bugs (*Cimicidae*), Destruction of, by Traps, India, 379
Biting arthropods, references to literature, xxxvi-vii, lxxvii
Fleas, Destruction of, by Traps, China, 379–80
Flies (House-flies), and Disease India, 377, 378
Effect on, of sound conservancy, 377
Glossina of British West Africa, distribution and species, 262–3
Insect destruction, by Traps, &c., 379-80
Mosquitoes, *see Anopheles, Culicidae, and Stegomyia*
Destruction of, 264, 279, 380, 381
Larvae of, notes on mounting, 264–5
Cases, ruling *re*, 383
Stegomyia apicoargentea in B. West Africa, 262
S. fasciata, in
British Somaliland, 263–4
British West Africa, 263–4
Hong Kong, 263
Java, 263

Insect Transmitters of Disease—*cont.*
S. sugens, British West Africa, 262
S. (unnamed), Tonkin, 263
Ticks on cattle, preparations to remove, 376

Juxta-articular Nodules, *see under* **MISCELLANEOUS**

KALA AZAR (and TROPICAL SORE), 130–43, 543–62
HUMAN AND GENERAL references
Anaemia, leishmanial, 133–4
Archibald's bodies and, 138
Bed-bugs as vectors, 554
Blood conditions in, and parasites found, 545
Diagnosis by
Cultural observations, 550
Leishmania from superficial lymph nodes, 130 *et sqq.*
Liver puncture, 545
Dogs as vectors, 544 *et alibi*
Attempts to infect with Mediterranean virus, 550
Inoculated with Indian virus, 130
Flying squirrel (*Galeopithecus volans*), *L. donovani* inoculated with, 130
Granular bodies from cases, 551
Housing in relation to, 364
Identity with canine, 134, 140, 557
Incidence
Age, and sex, China, 132
Geographical
Africa, 134, 543
West, 138, 551
Algeria, 134, 543
America, South, 227 543, 544
Assam, 363, 552 *et sqq.*
India, 130, 363, 543, 544, 545, 550, 552
Italy, 134
Malta, 133, 138, 543
Mediterranean regions, 130, 543, 545
Sudan, 138, 551
Inoculation experiments with
Dogs, 545–6, 547–8, 550
Jackals, 130
Mice, 139, 546
Monkeys, 130, 546–7
Insect vectors, *see* Bed-bugs, *and* Fleas
Jackal, inoculation of, with *L. donovani*, 130

Kala Azar &c.—*cont.*
HUMAN &c.—*cont.*
Leishmania of
Cultivation experiments, 133, 136, 138, 139
Methods of staining, 136–7
in Peripheral blood, 136, 545
from Superficial lymph nodes, 130 *et sqq.*
L. donovani, 138, 544, 545
Indian dogs infected by, experimentally, 545–6
Inoculation experiments, with various animals, 130
Results, compared with those of *L. tropica*, 560
L. infantum, 138, 546
L. tropica, 560
Macacus sinicus inoculation experiments, Mediterranean virus, 546
Mice, inoculation of, with
L. donovani, 130
L. infantum, 546
Parasites of, *see Leishmania*
Prophylaxis, 363–5, 552 *et sqq.*
Rats, inoculation of, with *L. donovani*, 130
References to literature, xvi–xvii, lii–liv
Segregation in regard to, 552 *et sqq.*
Serological researches into, 134-6
Specific amboceptors in, 135
Superficial lymph nodes as source of *Leishmania* for diagnosis of, 130, *et sqq.*
Symptoms, intestinal, 364
Transmission by
Bed-bugs, 364–5, 554
Dogs 541 *et sqq.*, *passim*
Fleas, experiments with, 543, 548–50
Infected coolie lines, 552 *et sqq.*
Treatment by
Nucleo-proteids, 135
Tartar emetic, 227

VARIANT FORMS
Indian, experimental, 130, 546–7
Identity with Mediterranean discussed, 543, 545–7
Incidence
Assam, 552–4
India, 130, 363, 543, 544, 545, 562
Leishmania from peripheral blood in cultures of, 550–1
Infantile, *see* Mediterranean

Kala Azar &c.—*cont.*
VARIANT FORMS—*cont.*
Mediterranean, 133 *et sqq.*
Blood-platelets in, 137
Cellular bodies from liver in, 137, 138
Diagnosis by Liver puncture, 545, 547, 550
Experimental, 130, 546–7
Flea flagellates and, 134
Incidence
Age, 544
Geographical
Algeria, 545
Hydra, 544
India, 545
Malta, 543
Portugal, 547
Spain, 544
Turkestan, 556
Seasonal, 544
Experiments with virus of on animals, 130, 546–7
Identity with Indian form discussed, 543, 545–7 *et alibi*
Leishmania in blood in, 545 550
Identity of, with those in Canine Kala Azar, 140
Serological researches into, 134–6
Pseudo Kala Azar, 225

CANINE, 138–40, 554–7
Ctenocephalus canis flagellates, experiments with, 548, 549
Diagnosis by
Bone puncture, 547
Laparotomy, 547
Dogs inoculated with Canine virus, 139
Experimental, 139, 543, 545–8
Eyes of Dogs as affected by, 555, 556
Fleas as vectors, experiments with, 134, 543, 548–50
Flagellates of fleas, transmission experiments with 548–50
Identity with human, 134, 140, 557
Incidence
Algeria, 138, 555–6
Brazil 557
France (Marseilles), 554
India (experimental), 543, 545–6
Malta, 543
Persia, 557
Portugal, 547 *et sqq.*
Sicily, 555
Spain, 544
Tunis, 139
Turkestan, 556

Kala Azar &c.—*cont.*
CANINE—*cont.*
Inoculation experiments with in various animals, 139, 140, 547–50
Keratitis as sign of, 556
Mice-inoculation with virus of, 139
Natural, in dogs,
Researches on, 138–9
Two types of, 139
Parasites of, 557
Cultivation of, 549
Experiments with, 548, 549
Pulex irritans, experiments with, 549
Rabbit-inoculation with virus of, 139
Sites of most intense infection, 547
Symptoms, 547–8, 555, 556
Types of, 139, 555–6
Transmission by
Fleas and Flea-flagellates, 548–50
Injections of virus into Animals, 139–40

EXPERIMENTAL, 130, 546-7
Agglutination in, 134
Allergic sero-diagnosis in, 135
Anaphylactic test in, 135
Blood examination in, 134
Blood in, Leishmania from, cultivation of, 136-7
Complement deviation in, 134, 135
in Dogs, *see* Canine
in Other animals, *see* Inoculation experiments *under* HUMAN AND GENERAL, *and under* CANINE

TROPICAL SORE, 140–3, 557–62
Blood examination for leucocyte formula, 559
Bordet-Gengou reaction, 562
Dermacentor variabilis as vector, 140
Diplococcus from, 561
Diptera as possible vectors, 140
in Dogs, S. America, 141
Experimental in
Mice, 560
Monkeys, 560
Incidence of
Geographical
Africa, North, 560
Agadè-Taoua region, 143
Algeria, 558
America, North, 561
South, 140–2, 544, 561, 562
Brazil, 141, 562
British Guiana, 141
Cambay, 560

Tropical Sore—*cont.*
Incidence of—*cont.*
Geographical—*cont.*
Chad region, 143
Dahomey, 558
India, 143, 560
Italy, 559
Mexico, 561
Morocco, South, 558
Nigeria, 142
Persia, 561
Sicily, 559
Syria (Jerusalem), 559–60
Tunis, 557, 558
Seasonal, 140
Insect vectors, actual and suspect, 140
Leishmania from, discovered culturally, 550
Rare in Frontier sore, 143
L. peruviana (in Uta), 142
L. tropica in, 558
Causal agent, 544
Infection by of Mice and of Monkeys; results, 560
Variant forms met at Tashkent,
canina, 557
major, 557
minor, 557
Naso-oral, gravity of, 141, 561–2
Treatment, 561–2
New parasite found in Jericho boil, 559–60
Oro-pharyngeal, 141, 227
Parasites of, and of Oriental sore, relation of, 560
Parasite causing, 544
Plasmosoma jerichoense, 560
References to literature, xviii, liii–iv
Tabanidae as vectors, 140, 141
Ticks as vectors, 140
Transmission by
Diptera (possible), 140
Tabanidae, 140, 141
Ticks, 140
Treatment by
Arseno-benzol and opium, 558
Mercury, 141
Neo-salvarsan, 148, 558, 561
Potassium iodide, 141
Salvarsan, 141, 142, 558
Tartar emetic, 141, 561–2
Trixidine, 562
Wassermann reaction in, 561, 562

VARIANT AND ALTERED FORMS
Espundia, in Peru, 142
Frontier sore, *leishmania* rare in, 143
Micro-organisms of, 143
Jericho boil, new parasite from, 559–60
Uta, in Peru, 142

LEPROSY, 187–200, 491–506
Bacteria and Micro-organisms of
Acid-fast, 187, 188, 189, 190, 200
Locale of, in man, and in rats, 494
Relative resistance of, 504
Resembling those of rat-leprosy (*q.v.*), in *Laelaps echidninus*, 505.
Karlinski's, how distinguished, 497
B. leprae, 187, & *n.*, *et passim*
Action on, of radium, 196–7
Cultivation of, 502
in Healthy persons, 190
in Nasal discharge, 497
Route of invasion by, 190
Staining methods for, 187
Duval's bacillus, 188
Cultivation of, 500–1
Hansen's bacillus, 493, 494
Cultivation of, 500–5
Differentiation of, 191
Karlinski's bacillus, 497
Kedrowsky's diphtheroid bacillus, 501–2, 504–5
Extract of, 189
Significance of, in leprosy-causation, 504–5
Stefansky's, 494, 505
Streptothrix of, cultures of, and vaccine from (Leprolin *q.v.*), 499–500
Treponema found in, 493
Bacteriology of, 188–90, 497, 499 *et sqq.*
Biopsy in diagnosis, 497
Bed-bugs as vectors, 187–8, 200
Feeding-experiments with, 499
Blatta germanica as vectors, 187
Blister-exudate of lepers, in
Prophylaxis, 196
Serotherapy, 195–6
Bone lesions in, radiographic study of, 499
Cancer death-rate in, (Russia), 199
Cauterization in, *see* Diathermy, *under* Treatment
Chaulmoogra oil for, *see also under* Treatment
Sources of, 327
Cimex lectularius as vector, 187
C. rotundatus and, feeding-experiments with, 499
Clinical aspects 188–9, 497–9
Cockroaches as vectors, 187
Combined infection in
Hansen's bacillus and a treponema, 493
Tuberculosis and, 190, 191
Compulsory notification, proposed, France, 491

Leprosy—*cont.*
Contagiousness of, 188–9, 492, 494, 499, 500
Control of, *see* Prophylaxis, *and* Treatment
Cures by Leproline (*q.v.*, *under* Treatment), 500
Demodex as vector, 505
Diagnosis by
Bacteriological examination of nasal mucous membrane, 497, 498
Biopsy, 497
Leprolin injections, 495, 497
Diet for patients under Leproline treatment, 500
Diphtheroid bacillus, isolated from lesions in, 501–2, 504–5
Extract of, 189
Drugs, &c., used in, *see under* Diagnosis, *and* Treatment
Fecundity of sufferers from, (Hawaii), 192
Feeding-experiments with Bed-bugs &c., 187, 499
Fish-eating in relation to, 505
Historical references to, 197–8, 491–2, 497, & *see* 508
Human, Specific organism of, according to Duval, 501
Incidence
in Free, and in prison population, 494
Geographical
Africa, 194
Basutoland, 187
German East Africa, 496
Nigeria, Southern, 333
Sierra Leone, 336
South Africa, 189, 195, 497
America, South, 492
Brazil, 190
United States, 197, 498
British Empire (*see also* India), 188–9
Assam, 192
Australia, 194
British Guiana, 194
United Kingdom, 497
China, 495
Comoro Islands, 495
Far East, 104
Federated Malay States, 502-4
France and colonies, 491–5, 497
New Caledonia, 493–4
Tonkin, 495
Germany, North, 189, 198
Hawaii, 188, 191, 192, 197–8
India, 194
Italy, 190
Japan, 189

Leprosy—*cont.*
Incidence—*cont.*
Geographical—*cont.*
Molokai, 188, 191, 192, 198
Norway, 188, 198
Penikese Island, U.S.A., 498
Persia, 194
Philippine Islands, 189, 193, 493
Russia, 189, 198, 199
Trinidad, 192
Turkey, 194
Maximum of, in recently infected regions, 494–5
Racial, 194, 492, 493, 494, 495
Inoculation experiments on animals, 190–1
Insect vectors, *see under* Transmission
Isolation and segregation in, 188, 189, 192, 197, 198, 491, 492, 494, 495–6
Leper birthrate, Molokai, 192
Lesions, Diphtheroid bacillus from, 501
Bone, radiographic study of, 499
Luetin reaction in, 192–2, 493
Maxima of incidence and severity in more recently infected regions, 494–5
Nasal conditions, in regard to diagnosis, 497, 498
Periplaneta orientalis as vector, 187
Prophylaxis(*see also* Isolation),197
Pulse-rate, as prognostic, 498
Radiographic studies in, 499
Radium - action, as affecting *B. leprae*, 196–7
References to literature, xviii, xix, liv
Reports on, Federated Malay States, 502–4
Sarcoptes as vector, 505
Serotherapy in, experiments with, 195–6
Severity of, in recently-infected regions, 494–5
Symptoms, 191, 497, 498, 499
Transmission
Experimental with
Animals, 190–1
Insects, 494, 499
Natural by
Contact with carriers, cases, clothing and bedding, 188–9, 492, 494, 500
Insects, 187–8, 505
Treatment by
Antileprol, 189, 192
Chaulmoogra oil, 189, 192, 327, 496
with Resorcin and vaccines, 194–5

Leprosy—*cont.*
Treatment by—*cont.*
Cultural extracts
Bayon's, 498
Kedrowski's bacillus, 189
Diathermy, 196
Green soap rubbing, 496
Leproline, 499, 500
Nastin, 192 *et sqq.*, 496
Potassium iodide, 497
Radiotherapy, 196
Resorcin, 194–5
Salt water baths, 500
Salvarsan, 493
Serotherapy, 195-6
Sodium chloride and vaseline ointment, 500
Sodium salicylate, 496
Vaccine (*see also* Leproline & Nastin), with
Chaulmoogra oil and resorcin, 194–5
Streptothrix Vaccine (Williams'), 195
Treponema infection in, 493
Tuberculosis and, in mixed infection, 190, 191
Glandular, in Molokai lepers, 191
Wassermann reaction in, 191–2, 493

Forms of
Achromic, resembling leucoderma, 498–9
Anaesthetic, 189, 192, 195, 196, 497
Leproline dosage in, 500
Nasal lesion absent in, 498
Macular, 189, 194, 195, 196, 498
Tuberculosis in, 191
Nodular, 189, 190, 191, 192, 195, 196, 497
Leproline dosage in, 500
Tubercular, diphtheroid bacillus from, cultural methods, and results, 501–2
Ulcerating, 192, 195, 498

Rat Leprosy, 199–200, 494, 505
Animals inoculable with, and refractory to, 505
Bacilli of, 200, 494, 505, 506
Experimental, 505–6
Incidence
Australia, 200
California, 199
New Caledonia, 494
Transmission
Experimental, with
Animals, 505
Insects, 505–6

Leprosy—*cont.*
RAT LEPROSY—*cont.*
Transmission—*cont.*
Natural by
Flies, 505, 506
Laelaps, 200, 505
Rat-to-Rat, by bites, 505
Sarcoptes and *Demodex* (indirect), 505, 506
Two forms of, 505

LINGUATULIDA INFECTIONS, 276–7
Ankylostomiasis, with larva of *L. serrata*, 277
Parasites connected with, 276–7
Linguatula Frölich, 277
L. recurvata, in peccary, 277
L. serrata, (larva), in man, Brazil, 277
L. subtriquetra in cayman, 277
Pentastoma denticulatum and, 277
Porocephalus armillatus, 276
Humboldt, 277
Raillietiella, *ib.*
Reighardia, *ib.*
Pathology, 276
Porocephaliasis in man, in
Belgian Congo, 276
Brazil, 277
German West Africa, 276
Nigeria, Southern, 276
References to literature, xxxiii, lxxiv
Symptoms, 276

MALARIA, 47–61, 144–60, 256–60, 431–42
Agriculture in relation to (rice), 152–3
Amnesia of, and of tobacco, 257
Anopheles associated with
albimanus (a), 155, 227
albirostris, 154
argyrotarsis, 155, 227
barbirostris, 154
costalis, 262, 435
crucians, 48
culicifacies, 153, 347
funestus, 262
ludlowii, 435
maculatus, 154
maculipennis, 256.
metaboles, 154
mochii, 154
nimba, 227
nivipes, 154
punctipennis, 48
rossii, 154, 435
sinensis, 153, 154, 434
umbrosus, 154

Malaria—*cont.*
Anophelines found at Panama, 155
Screening against, 150–1
Antimalarial Information forms, Colonial Office, 351–2
Measures, *see* Prophylaxis
Properties of alkaloids allied to quinine, 257
Appendicitis simulated by, 144
Bats as mosquito destroyers, 380
as Reservoir hosts for parasites of, 259
Blackwater fever in, 433, 434
Blood conditions in, 144, 145, 146, 155, 431, 432, 442, 444
after Splenectomy, 258–9
Blood cultures in diagnosis, 432
Brachyurus calvus, host of *P. brasilianum*, 160
Carbolic acid, crude, as larvicide, 380–1
Cercopithecus, *P. kochi* in, 160
Cerebro-spinal fluid in, 49
Chemotherapy, 435
in Children, 49, 50, 156, 157
Quinine salts for, 53–4
Circulatory disturbance from, 144
Clinical notes, 48 *et sqq.*
Colour (skin) in relation to, 158–9
Coma associated with, 48–9, 50
Complement-fixation reactions and diagnosis, 431
Diagnosis, 48–51
Bordet-Gengou phenomenon in, 145–6
Differential, of hepatitis of, and suppurating hepatitis, by leucocyte formula, 442
Epidemiology, 431, 433
Freedom from, of Cebu, 435
Fish, larvivorous, in relation to, 57, 153, 157, 381–2
Millions, 155
Giemsa's spray, as prophylactic, 156, 157
Immunity
Conferred by, 146
Natural ferments and, 149
Skin colour in relation to, 158–9
Incidence
Geographical
Africa
Algiers, 50, 51, 144, 433
Anglo-Egyptian Sudan, 50
German East, 52, 57, 153, 156–7
South West, 148
West, 157
Morocco, 433
Nigeria, Southern, 333, 335

Malaria—*cont.*
Incidence—*cont.*
Geographical—*cont.*
Sierra Leone, 335 et *sqq.*, 353
Soudan, French, 434
Africa—*cont.*
Uganda, 342
Zululand, 59
America, South
Amazon region, 226-7
Brazil, 51, 144
America, U.S.
Arkansas, 256
New England States, 55
North Carolina, 48, 159
Andaman Islands, 435
Annam, 438
Austria, 156
Barbados, 155
Bismarck Archipelago, 381
British Guiana, 155, 353, 351
Ceylon, 151–3, 349
Rural areas, 346–8
Urban areas, 348
China
Hong Kong, 148
Northern, 434
Western, 434
Cochin-China, 56
Cyprus, 259
India, 58, 146, 154, 158–9, 353, 360, 377
Indo-China, 433
Italy, 47, 158, 256, 436–7
Madagascar, 55
Malaya, 153
Malta, 144
Panama Canal Zone, 144–5, 150–1, 154–5
Philippine Islands, 52
Sardinia, 436, 437
Sicily, 258
Sumatra, 154
Sunda Islands, 444
Tonkin, 433, 443
Turkey-in-Europe, 144
Occupational, Calabria, in fruit-pickers, 436–7
Seasonal, 146–7, 150, 151–2, 256, 434, 436–7
Incubation period, 431
Izo-izal, as larvicide, 152
Kerosine as larvicide, 153
Laverania malariae, see P. praecox
"Larvicide," 152
Larvicides in the field, 152–3
Leucocyte-formula in diagnosis, 431, 442
Liver changes in, 49, 51
Macacus cynomologus (and genus), hosts of *P. inui*, 159, 160
Merck's dextrose, in cultivation of Plasmodia, 438, 440

Malaria—*cont.*
Monkey hosts of Plasmodia, 159–60
Mortality, Panama Canal Zone, 150
Mosquitoes and, *see Anopheles, see also* Incidence
Destruction of (*see also* Fish, larvivorous), 47, 151–6, 157, 159, 259, 377, 379, 380–2
Nets against, 155
and Peripheral distribution round towns, 353
Screening of houses against, 150–1, 155
Seasonal prevalence, 146, 150
Transmission by, 47, 48, 150, 152, 153, 155, 353, 433, 434, 437, 438
Myzomyia, see culicifacies, under Anopheles
Myzorhyncus, see sinensis, under Anopheles
in Newborn infants, 52
Orang-outang of Borneo host of, *P. pitheci*, 160
Paralysis associated with, 49
Parasites, *see also Plasmodia* below
Action on, of
Hectine, 55
Neo-salvarsan, 55
Artificial culture of, 432
Mammalian hosts (suggested) of, 259
New human, 432
Parasite rates, and distribution, French Soudan, 435
Seasonal prevalence of different kinds, 431
Pesterine, as larvicide, 153
Petrol, as larvicide, 57, 152, 153, 157
Phenyle, as larvicide, 152
Plasmodia of
Cultivation of, 58–9
in vitro, 438–42
in Monkeys, 159–60
Differential diagnosis of, 160
Plasmodium falciparum, 51, 435
Morphology, 50
New species resembling, 432
P. inui, biology and pathogenicity, 159
Monkey hosts of, 159–60
P. kochi, monkey host of, 160
P. malariae, 51, 160
P. pitheci, in orang-outang, 160
P. praecox, cultivation of, 58–9
Change of name for, 435
P. tenue, n. sp., peculiarities in, 432
P. vivax, 51, 52, 159
Pot. cyanide as larvicide, 152

Malaria—*cont.*
Problems of, 431
Prophylaxis (*see also* Bats, Incidence, Larvicides, Mosquito destruction, Treatment, & Traps), 47, 48, 56–8, 146–7, 154, 155, 256, 260
Based on occurrence of malarial prodrome, 157–8
Periphery of a malaria-stricken town, and, 353
Planting of "French grass," 344
Quinine in, 47–58, 146–7, 155, 156, 158, 159, 259, 347, 348, 360, 433, 436, 437, 438, 443–4
Compulsory (Tonkin), results, 443–4
Native dislike to, 155, 156
Inability to tolerate, 156, 157
Small daily doses, 432
Proteosoma grassi, change of name of, 435
Purpura, probably of malarial origin, 436
Quinine in, *see under* Prophylaxis, *and* Treatment
Quininization, *see under* Prophylaxis
Recrudescence and relapses in, 431
References to literature, xix–xxii, lvi, lxxiv, lxxx
Relapses in, 148, 431
Etiology of, 149
Ratio of, to fresh infection, and to total attacks, 146–7
after Salvarsan treatment, 258
after Splenectomy, 259
Rice cultivation and, 152–3
Sanitas-okol, as larvicide, 152
Schizonts, multiplication of, *in vitro*, 442
Serum of, researches on, 146
Skin-colour in relation to, 158–9
Spleen in
Hypertrophied
Removal of, 258–9
Rupture of, 144–5
X-ray and radium treatment of, 55–6
Spleen rate in
Ceylon, 152, 153
London school children, 259
Malay States, 154
Splenectomy in, 258–9
Symptoms
Asthmatic, 144
Aortitic, 144
Appendicitic, 144
Cerebral, 48–9, 256
Meningitic, 49

Malaria—*cont.*
Symptoms—
Diarrhoeal, 250
Icteric, 250
Paralytic, 49
Peritonitic, 145
Prodromal, 157–8
Splenic, 144–5, 258–9
Transmission by
Human agency, 47, 48, 57, 58
Maternal, 51, 52
Improved means of transport, 433
Insects, *see Anopheles, and* Mosquitoes
Treatment by
Amylopsin, 149
Arrhenal, 55
Cacodylate of Soda, 436
Chinäthylin, 257
Chinidin and Hydrochinidin, 257
Cinchonin and Hydrocinchonin, 257
Cuprein, 257
Enzymes, 148–9
Ethylhydrocuprein hydrochloride, 435–6
Euquinine, 144
Hectine, 55
Mercury perchloride, 258
Neosalvarsan, 54–5, 258
Quinine, *see also* Prophylaxis 47–59, 144–9, 155–9, 347, 348
Administration, various methods, 52, 53, 54, 57, 147, 432
Anaemia after, 56
Neglect of, 227
Alkaloids allied to, and derivatives of, 257
Advantages claimed for, 147–8
Bihydrochlorate, 435–6
and Salvarsan, 148, 258
Tannate (in children), 258
Radium emanations, 56
Salvarsan, 148, 258, 432
and Quinine, 148, 258
Surgery, 145, 258–9
Trypsin, 149
Waters of La Bourboule (arsenical), 436
X-rays, 55–6
Urobilin secretion in, diagnostic value of, 431, 444
Xex-green as larvicide, 152

Various Forms
Asthmatic, 144
Atypical, diagnosis of, 50–1
Cerebral, *see under* Pernicious
Chronic
Aortic degenerations in, 144
Liver conditions in, 51

Malaria—*cont.*
VARIOUS FORMS—*cont.*
Congenital, rarity of, parasites found in, 51–2
Experimental, by *P. inui*, in monkeys, 159–60
Isigwebedhla, a form of tropical, 59
Latent
Diagnosis of, by
Blood cultures, 432
Complement-fixation reactions, 431
Mononuclear leucocytosis, 431, 442
Urobilinuria, 431, 444
Pernicious, cerebral, 48–9
Tertian, locale and vectors, 48
Relapses in, treated by Salvarsan, 148
Tropical, 59

Malta Fever, *see* **UNDULANT FEVER**

MISCELLANEOUS (not including at this place such references under that head as are indexed elsewhere), 225–33, 280–4, 325–7, *see also* **Reports**
Analysis of 500 fatal medical cases, Panama Canal Zone, 228
Anophelines of Amazon region, 227
Ascaris ova in faeces, Jamaica, 226
Bicho, three forms of, in Brazil, 327
Bile-duct and liver diseases, in tropics, 281
Bubo, climatic, Australia, 229–30
Calcutta p.m. records, percentages of deaths from tropical diseases, and diagnostic errors, 326
Cerebro-spinal fever in Uganda, 342
Chickenpox in Bengal, 360
Creeping Disease, Kamerun, 225
Deaths from tropical diseases, Calcutta, causes, percentages, 326
Diarrhoea in India
Bombay death-rates, 362
in Jails, 378
Dysmenorrhoea, in Tropics, 230
Endomyces in Man, 283
Epidemic gangrenous rectitis, 327
Epidemic of unusual character, Philippine Islands, 280
Epidemiology of the Amazons, 226–7

Miscellaneous—*cont.*
Espasmo Tropical, 280
Eumenol, in painful menstruation in tropics, 230
Fistulous disease of buttocks, China, 228, 229
Gynocardia odorata, chaulmoogra oil from, 327
Haulmaulwurf, Kamerun, 225
Hydnocarpus wightiana, substitute for chaulmoogra oil from, 327
Incidence of diseases, &c., referred to
Brazil, Jigger in, 327
China, diseases in, of which the parasitic causes are obscure, 228–9
India, in
Bombay, death-rates, 362
Jails, 378
Kamerun, pathology of, 225
New Pomerania, and population decrease in, 283–4
Panama Canal Zone, analyses of 500 fatal medical cases in, 228
Philippine Islands, epidemic in, 280
Febrile tropical splenomegaly in, 228
Porto Rico, diseases of, 228
Espasmo Tropical in, 280
South Africa,
Soroche in, 281–3
Splenomegaly in, 283
Jigger, in Brazil, 327

JUXTA-ARTICULAR NODULES
Discomyces carougeaui Neveux, 325
Incidence
Belgian Congo, 326
Guinea, 326
Madagascar, 335
Senegal, 326
Onchocerca volvulus cysts in, 326
Parasites in, 325–6
Treatment by Iodide of, Potassium, 326
Maculae, pigmented, *see* Purú-purú, *below*
Menstruation, painful in tropics, therapy of, 230
Mineral water and ice factories, licensing of, Uganda, ruling, 383
Mountain Sickness in the Andes, 281–3
Muscle abscesses, 281
Oroya Fever, *see under* **Verruga Peruviana**
Pneumonia in rats (Manchuria), 369

Miscellaneous—*cont.*
Population decrease, New Pomerania, 283–4
Pseudo-kala-azar, Kamerun, 225
Purú-purú, Amazon region, 227
References to literature, xxxiii–vi, lxxiv *et sqq.*
Splenomegaly (*see also under* Malaria), S. Africa, 283
Febrile tropical, China, 228–9
Stethomyia nimba, Amazons, 227
Taraktogenos kurzii, chaulmoogra oil from, 327
Tick Paralysis, in sheep and man, B. Columbia, 230–1
Ticks causing, 230–2
Trichuris ova in faeces, Jamaica, 226
Tropical medicine, two early 18th century treatises on, 327
Ulcerating granuloma of pudenda, Kamerun, 225
Uta, references to literature, lxxiv

MYIASIS, 273–5
Caused by
Chrysomyia macellaria larvae, 273
Coleopterous insects, 273–4
Dermatobia hominis (*cyaniventris*), biology, 274–5
Pycnosoma flaviceps, 273
Sarcophaga sarraciniae, 274
Fly larvae as human parasites causing, 274
Forms of
Internal Sarcophagidae, 274
Intestinal, 273–4
Nasal, 273, 274
Incidence
Brazil, 273–4
India, 273
Janthinosoma, and *Dermatobia cyaniventris* eggs, 274–5
Mosquitoes as vectors, 274–5
References to literature, xxiii, lx.
Symptoms, 273–4
Treatment
Calomel, 274
Purgative, 274
Santonin, 274

PAPPATACI, PHLEBOTOMUS, OR SANDFLY FEVER, references to literature, xxiii, lx.

PELLAGRA, 300–14
Abderhalden's serum reaction in, 311
Agglutination tests in, with sera from pellagrins and normal persons, 309–10

Pellagra—*cont.*
Alcohol in relation to, 302
Bran in food, in relation to, 305
Husks of grain, absence of, in relation to, 302, 305
Case resembling, possibly Dermatitis exfoliativa, 307
Clinical notes on, 306 *et sqq.*
Diagnosis of early and undeveloped cases, 307
Etiology, 302, 303 *et sqq.*
Causes of (possible) 305
Hookworm infection, 305–6, Micro-organisms, 305
Isolation of positive causative factor, 305
Theory of (absence of chemical essential from diet), 305
Experimental, 304, 311–2
Haematology in, 310
Heredity in relation to, 301–2
Hypersensibility of maize-fed guinea-pigs to pellagrous blood serum, 312–3
to Maize extract, of sufferers from, 314
Immunity experiments in, 312
Incidence
Geographical
America, United States
Illinois, 309
Kansas, 303–4
Maine, 300
Massachusetts, 300
Mississippi, 300
South Carolina, 310
Australia (N. S. Wales), 313
British Guiana, 300
Egypt, 307
Italy 302, 305, 308, 314
Natal, 307
Nyasaland, 301, 309
Rhodesia, 305
Roumania, 308
Spain, 302
Tyrol, 302
United Kingdom
England, 303, 306, 307
Ireland, 306, 307
Scotland, 303
Wales, 306
Race, 300
Sex, 301, 303
Intestinal bacteria in, 309–10
Laboratory work on, 311 *et sqq.*
Maize in relation to, 300 *et sqq.*
Maize extract, immunity and, 312
in Treatment, *see below*
Metabolism in, 310–11
Nervous system as affected in, 308–9
Pathology 308 *et sqq.*
Histopathology of nervous system, 308

Pellagra—*cont.*
Prophylaxis, 302, 314
References to literature, xxiii–iv., lx.
Rice, in relation to, 312
Symptoms, 300–1, 306–7, 312–4
Transmission
Experimental
Man to monkey, 304
Natural by
Mosquitoes, 303, 304
Sandflies, 303–4
Simulium, 301
Stomoxys calcitrans, 303
Treatment
Dietetic, with grains and their husks, or by adding bran, 305
Fowler's solution, 308
Iodide of potassium, 308
Iron arsenite, 308
Maize extract, 312, 313, 314
Nicolaidi's serum, 308
Sodium cacodylate, 308
Urotropin, 307
Zeism or, 305

PLAGUE, 201–9, 366–71
Bacteria associated with
Bacillus enteritidis, Gaertner, in flea-larvae, 205
B. pestis, cultural vaccines of, 208
in Fleas, 205
Morphology, 206–7
in Rats, 203
in Suspected pneumonic case, 209
in Tarbagan, 202
Virulence of, as affected by Cultural media, 205–6
Facility of ingestion of, by human leucocytes, 206
B. pyocyaneus, in flea-larvae, 205
B. typhosus, in pneumonic case, 209
B. violaceus, not found in flea-larvae, 205
Staphylococcus albus, and *aureus*, in flea-larvae, 205
Bed-bug (*C. lectularius*) larvae, action on of vapours of insecticides, 209
Ceratophyllus fasciatus, action on, of insecticides, 209
Bionomics, 204, 205
Transmission by, 201, 207
C. gallinae, bionomics, 203
C. silantievi, 202
C. lectularius larvae, action on, of insecticides, 209

Plague—*cont.*
Ctenocephalus canis, bionomics, 204, 205
Epidemiology, 202, 203, 228
Flea-trap (Chinese), 379-80
Fleas, Rat, and other, *see also Ceratophyllus, Ctenocephalus, and Xenopsylla*
Effect on, of
Temperature and humidity, 204
Vapours of insecticides, 209
in Annam, 203
in Colombo, 205
in Manchuria, 202
in Madras, 205
in Shanghai, 207
on Tarbagan, 202
Transmission by, 202, 203
Experiments with, 201
Immunisation, experiments in, with rats, 205–6
Incidence (all forms)
Age and sex, 367
Geographical
Annam, 203
Argentina, 207
California, 208
Ceylon, 370
China (Shanghai), 207
India, 201, 353, 370, 383
Italy, 207–8
Manchuria, 202
Morocco, 203
Philippines, 370–1
Porto Rico, 228
Uganda, 342, 343, 344
Seasonal, 201, 202, 203
Inoculation experiments in, conjunctival &c., 208
Insect vectors of, *see* Bed-bugs, *and* Fleas
Insecticides, action on
Bed-bug larvæ, 209
Fleas, larvæ and adult, 209
Leptopsylla musculi, bionomics of, 204
Mouse destruction and, 208–9
Mus decumanus infected with, 207
Mus musculus, infected with, 367
Mus norvegicus, height leaped by, 208
Plague-infected, 367
Mus rattus, plague-infected, 207
Naphthalene as insecticide, 209
Phagocytosis of bacillus of, in relation to cultural media, 206
Prophylaxis, 207, 208, 209, 366 *et sqq.*
Vital statistics in, 383
Pulex irritans, bionomics, 204–5
Rat-destruction and, 208–9
Rat-eviction methods in, 367

Plague—*cont.*
Rat-fleas, *see also Ceratophyllus*, & Fleas
Bionomics, 204–5
Rat-guards for ship's lines, 370–1
Rat-proofing of houses and sewers against, 207, 208
Ratt-entritt, action of, 208–9
Rats as vectors, *see under* Transmission
References to literature, xxiv–v, lxii–v.
Symptoms, 367
Ticks as vectors of, 202
Transmission by
Bed bugs, 209
Human carriers, 368–9
Rat-fleas, 203, 207, 368–9
Mechanism, 201
Rats and Mice, 207–8, 228, 366 *et sqq.*
Experiments on, 201, 205
Ticks, 202
Treatment by Vaccine, 208, 343
Xenopsylla cheopis, action on, of insecticides, 209
Bionomics, 204–5
Transmission by, 201, 207

Bubonic
Domestic animals, infected with (Morocco), 203
Incidence
Annam, 203
Argentina, 207
Ceylon, 370
China (Shanghai), 207
India, 201
Italy, 207–8
Morocco, 203

Doubtful Cases, blood-cultures in, value of, 209

Pneumonic
Atmospheric temperature, and spread of, 202
Bacteriological diagnosis, 209
Incidence, geographical and seasonal
Ceylon, 370, 383
India (Madras), 370, 383
Manchuria, 202
Serum agglutination in, 209
Ticks as vectors, 202
Transmission by
Bed-bugs, 202
Fleas, 202
Tarbagan and parasites, 202
Ticks, 202

Plague—*cont.*
Rat
B. pestis from, morphology of, 207
Incidence
America (California), 207
China, 207
Italy, 207–8
Prophylaxis, 207–8

Septicaemic
Incidence
Ceylon, 367–70
India (Madras), 370

Porocephaliasis, *see under* **Linguatulida Infections**

PROTOZOOLOGY (excluding most Amoebae, and most Trypanosomes), 112–29, 511–26
Acipenser ruthenus, *Haemogregarina ascipenseris* (?) from, 513
Agrippina bona, nuclear structure and sporulation of, 125
Amoebae from
Air, food, and dust, 514.
Human stools, French Guinea, 119
of Non-dysenterics, 513–4
Encysted, longevity of, tests of, 514–5
Limax-type in culture from faeces, 513
Anaemia of rodents, freely bitten by *C. fasciatus*, due to *Herpetomonas pattoni*, 515, 516
Anaplasma, coccoid bodies in 126
Ancyromonas genus, 121
Anguilla vulgaris. *Tryp. granulosum* (and others) from, 524
Anopheles maculipennis, flagellates of, 122, 123
Asilus, *Leptomonas* from, 120
Bacillus krusei infection in frog; results, 524
Balantidia, classification, &c., of, 514
Balantidium coli, in monkey, 120
Bird-fleas, transmission experiments with, 121
Birds, diseases of, due to *Haemoproteus*, 517–8
Parasites from, 511, 512, 513
Blood conditions and diseases, *see also* Erythrocytes, *and* Leucocytes
in Birds, due to *Haemoproteus*, 517–8
in Pigeons, with *Toxoplasma canis* infection, 521

Protozoology—*cont.*
Blood parasites (and their transmission) of
Chaffinches, 121
Water frogs, 121–2
Bodo genus, 121
Bone marrow, Kurloff bodies in, 524
Bycanistes albotibialis, trypanosome from, 512
Bulbar paralysis, experiments in, 519–20
Calliphora erythrocephala infection of, by *Nosema apis*, 128
Cats, immunity of to *E. tetragena*, French Guinea, 119–20
Cattle, hereditary infection of, by tick-crithidia, 123–4
Trypanosomes in, Haut-Senegal-Niger, 119
Ceratophyllus fasciatus, agent of rat and mouse infection by *Herpetomonas pattoni*, 515–6
Larvae of, *Agrippina bona* in, 125
Transmission experiments with, 120, 515–6
C. gallinae, 121
Cercomonadidae, classification, &c., of, 514
Cercopithecus monkeys, *Plasmodium kochi* from, 119, 512
Chaffinch, blood-parasites of, transmission of, by fleas, 121
Chlamydozoa, and Kurloff bodies; comparisons, 524–5
Chrysozona vanden brandeni, crithidia from, 120
Ciliates from air, dust, and food stuffs, 514
Cinixys belliana, *Plasmodium roumei* from, 119
Cletus bisbipunctatus, Leptomonas from, 120
Coccidia, *Varanus* haemogregarines as belonging to, 519
Coccoid bodies in
Anaplasma, 126
Grahamella, 126
H. simondi, 126
Spirochaetes, 126
Cosmolestes pictus, Leptomonas from, 120
Countries from which observations are noted
Brazil, 127–8, 519, 521
Ceylon, 521
China, 511
Cochin-China, 514
Congo, Belgian, 120
French, 512

Protozoology—*cont.*
Countries from which &c.—*cont.*
Egypt, 123–4
Eritrea, 519
France, 523
French Guinea, 119–20
Gambia, 518
Germany, 513
India, 511
Italian Somaliland, 519
Italy, 121
Martinique, 511
Russia, 513
South Africa, 518
Switzerland, 523
Tunis, 520
Crithidia, origin of, discussed, 121
C. fasciculata from *Anopheles maculipennis*, 123
Culex pipiens, 121, 517
C. hyalommae, in Egyptian cattle, morphology, biology, and transmission by ticks, 123–4
C. melophagia, feeding experiments with, on mice, 516
Hereditary infection by, of *Melophagus ovinus*, 124
C. pangoniae, 120
C. tenuis, 120
C. vacuolata, n. sp., from a reduviid, 120
Crithidial flagellate from *S. fasciata*, 511
Ctenocephalus canis, Herpetomonas of, experiments with, 122
Culex pipiens, crithidia or flagellates of, 517
Natural host of *Crithidia fasciculata*, 121
Cultural amoebae from faeces, 513
Cynocephalus, *Balantidium coli* from, 120
Dactylosoma ranarum, biology of, 122
Dendrocoelum lacteum, *Tryp. dendrocoeli* in, 125
Diptera and *Nosema apis* infection, 128
Dogs, Toxoplasma of, researches on, 127–8, 520
Donkeys, trypanosomes of, French Guinea, 119
Duration of life of various kinds of protozoa, 514–5
Dust, amoebae, flagellates, and ciliates from, 514
Eels, *Tryp. granulosum* (and others) from, 524
Elleipsisoma thomsoni, in moles, 121, 523
Eimeria prevoti, in frogs, 122

Protozoology—*cont.*
Entamoebae, classification &c., of, 514
E. coli cysts in non-dysenteric faeces, 513
E. tetragena, cat-immunity to, French Guinea, 119–20
E. tetragena-like amoebae in stools, 119
Eosinophile leucocytes, Kurloff bodies in relation to, 524
Erythrocytes of moles, containing Graham-Smith bodies, 522–3
Smithia talpae, 523
Euphorbia indica latex, Leptomonas from, 120
Fish, parasites from, 513
Falco tinnunculus, *Haemoproteus danilewskyi falconis* from, 518
Flagellates from
Air, dust, and foodstuffs, 514
Ctenocephalus canis, and *Anopheles maculipennis*, 122–3
Flies, 124
Insects, Belgian Congo, 120
Invertebrates, in relation to trypanosomes of vertebrates, 516
Non-dysenteric stools, 514
Longevity of, tests of, 514
Flatworms, *Tryp. dendrocoeli* in, 125
Fleas, transmission experiments with
Bird-fleas, 121, 125
Rat-fleas, 120
Rat, gregarine larvae in, 125
Herpetomonas pattoni transmission by, 515–6
Trypanosoma lewisi transmission by, 120
Flies, *see also* Diptera, *and* Hippoboscid
Herpetomas of, development of, 124
Herpetomonas danilewskyi transmitted by, 518
Food materials, protozoa from, 514
Frogs, *Bacillus krusei* and *Tryp. rotatorium* infection in: results, 524
Water frogs, blood parasites of, transmission of, 121–2
Goats, new types of protistan parasite from, 515
Selenomastix from, 121
Golunda fallax, *Grahamella* from, 119
Gondi, Toxoplasma from, 121, 127
Graham-Smith bodies, in mole-erythrocytes, 522–3

Protozoology—*cont.*
Grahamella, coccoid bodies in, 126
in *Golunda fallax*, 119
in Rats, 119,
G. talpae, 121, 523
Granule-shedding in parasites, 126
Gregarine, *Agrippina bona*, from rat-flea larva, 125
Guinea-pigs, Kurloff bodies in bone-marrow of, 524
Pulmonary cysts in, after trypanosome inoculation, 523-4
Trichomonads from, 517
Haemamoebae
Haemamoeba liothricis in *Liothrix luteus*, 511–2
H. majoris, 511
H. tenuis, *in Liothrix luteus*, 511
H. ziemanni, 511
Haemogregarines, classification of, 512, 519
from Monitor, life-cycle of, 518–9
Haemogregarina ascipenseris (?) from sturgeon, 513
H. esocis n. sp., from pike, 513
H. minima, synonym for, 122
H. simondi, coccoid bodies of, 126
Granule-extrusion by, 126–7
H. toddii, 519
Haemoproteus, or Halteridium genus
H. columbae, flies transmitting, 518
H. danilewskyi in birds, 518
Flies transmitting, 518
Haemosporidia, 120
Halteridia (Haemoproteus), in birds, 121, 518
Halteridium fringillae, 121
Hemiclepsis, and transmission of frog-trypanosomes, 121, 122–3
H. marginata, parasites in, 122
Hemiptera, as hosts of Leptomonas, &c., 120
Hereditary protozoal infection, *see* Cattle
Herpetomonads
Herpetomonas ctenocephali, experimental infection with, 122–3
H. pattoni from *C. fasciatus*, rat infection by, 515
Experimental, by various methods, 515, 516
Natural, by bites, 515
Three types of, 516
H. stratiomyiae, developmental stages of, 124
Herpetomoniasis, experimental, in white mice, 516

Protozoology—*cont.*
Hippoboscid fly, transmitter of *Herpetomonas danilewskyi columbae* in S. Africa, 518
Horses, trypanosomes in, French Guinea, 119
Hyalomma aegyptium, crithidia infecting, 123–4
Hymenoptera, other than bees, *Nosema apis* pathogenic to, 128
Infective granule in life-history of protist organisms, 126
Infusoria, life-length of, in sealed flasks, 514
Insect flagellates, Belgian Congo, 120
Insect transmission, *see* Fleas, Flies, Ticks, &c.
Insects other than bees, to which *Nosema apis* is pathogenic, 128
Intra-cellular stage in *Tryp. dendrocoeli*, 125
Isospora lieberkühni in frogs, 122
Japanese nightingale, haemamoebae and toxoplasma in, 511–2
Kestrels, *Haemoproteus danilewskyi* of, 518
Kurloff bodies, morphology of, 524–6
Researches on, 121, 128–9, 524
Lamblia cysts in non-dysenteric stools, 514
Land tortoise, plasmodia in, French Guinea, 119
Lankasterella minima, in frogs, synonyms for, 122
Leishmania forms in experimental infection with *Herpetomonas ctenocephali canis* and *Crithidia fasciculata*, 122–3
Granule-shedding in, 126
Lepidoptera, *Nosema apis* infection in, 128
Leptomonad flagellate of *Culex pipiens*, 517
Leptomonas, from Hemiptera &c., 120
L. mirperi, 120
Lettuce-leaf infusion, amoeba from, 514
Leucocytes, eosinophile, Kurloff bodies in relation to, 524
Leucocytogregarina, 512
New species of, 519
L. arvalis, n. sp., 519
L. cuniculi, n. sp., 519
L. plicata marmotae, n. sp., 519
L. rotundata canis familiaris, n. sp., 519

Protozoology—*cont.*
Leucocytozoa, 512
Leucocytozoon struthionis, morphology of, 126
Liothrix luteus, haematozoa and trypanosome in, 511–2
Lymphocytozoon cobayae, developmental stages of, 524
Lynchia genus of flies, *Haemoproteus danilewskyi* transmitted by, 518
Mammals, new leucocytogregarines from, 519
of Man, pathogenic, present day knowledge of, reviewed, 514
Melophagus ovinus, hereditary infection of, by *Crithidia melophagia*, 124
Infection of, by *Nosema apis*, 128
Mice, *Crithidia fasciculata* infection in, 123
Graham-Smith bodies from, 522, 523
Herpetomonas pathogenic to, 122, 515–6
Toxoplasma gondii infection in, 520
Trichomonads of, 517
Micro-spirillum in *Stegomyia fasciata*, 511
Microsporidiosis in insects, from *Nosema apis*, 128
Mirperus jaculus, Leptomonas from, 120
Moles, blood parasites of *Ellcipsisoma thomsoni*, 121, 523
Graham-Smith bodies, 522, 523
Smithia talpae, 523
Monitor, hæmogregarine from, life-cycle of, 518-9
Monkeys, *Balantidium coli* from, 120
Plasmodium kochi in, French Congo, 512
French Guinea, 119
Mosquitoes, *see Anopheles, Culex, and Stegomyia*
Bacteria of, 511
Crithidia of, 123, 511, 517
Flagellates of, 122, 123, 511
Spirochaetes from, 511
Yeasts from, 511
Mus rattus, Grahamella from, 119
New type of protistan parasite from goats, &c., 515
Nosema apis, pathogenicity of, to insects other than hive bees, 128
Oikomonas termo from dry-preserved bark-paper, 514-5
Olfersia capensis, as transmitter of *Haemoproteus danilewskyi columbae*, 518

Protozoology—*cont.*
Ostrich, Leucocytozoon found in, 126
Pathogenic protozoa, of man, classification, &c., discussed, 514
Pigeons, *Haemoproteus danilewskyi* from, 518
Kurloff bodies in bone-marrow of, 524
Nervous system of, as seen after *Toxoplasma canis* inoculation, 520–1
Trichomonas columbae in, 124–5
Pike, *Haemogregarina esocis*, n. sp., from, 513
Trypanoplasma gurneyorum from, 513
Trypanosoma remaki, var. *magna*, from, 513
Pirrhocorides larva, Crithidia from, 120
Plasmodia, classification &c., 514
Plasmodium kochi, in monkeys, 119, 512
P. roumei, in land tortoise, 119
Pneumocystis carinii, 523–4
Proflagellate in goats, 515
Protozoa from food-materials, 514
of Soil, 121
Protozoa-like bodies in splenomegaly, Ceylon, 521-2
Pulmonary cysts in
Guinea-pigs with various trypanosome infections, 523–4
Rats, with *Trypanosoma lewisi*, 523
Rabbits, enlarged spleens of, new Leucocytogregarina from, 519
Trypanosoma rhodesiense infection in; results, 524
Rana esculenta, haemogregarine infection in; results, 524
Grahamella from, 119
Inoculated with *Herpetomonas ctenocephali*, 122–3
Infected with *Herpetomonas pattoni* from *C. fasciatus*, 515–6
Rats, Graham-Smith bodies from, 522, 523
Parasites of, in French Guinea, 119
Trypanosoma lewisi in, 119
How transmitted, 120
Pulmonary cysts present with, 523.
Rat fleas, *see Ceratophyllus fasciatus*
Reduviids, Crithidia and Leptomonas from, 120

Protozoloogy—*cont.*
References to literature, xxxvii–viii, lxxviii–lxxx.
Rhinocoris albopilosus, flagellates from, 120
Ruminants, new protistan parasite from, 515
Selenomastix from goats, morphology of, 121
S. ruminantium, from goats, &c., 515
Serinetha, Leptomonas from, 120
Smithia talpae, n. sp., in mole's blood, 523
Soil, protozoa of, 121
Spirochaetae, classification, &c., of, 514
Coccoid bodies in, 126
S. refringens, one like in *Stegomyia*, 511
Spleen, hypertrophied, Ceylon, protozoa-like bodies in, 521
Sporozoa, classification, &c. of, 514
Stegomyia fasciata, intestinal flora of, in relation to yellow fever, 511
Stratiomyia chameleon, and *S. potamida*, Herpetomas development in, 124
Sturgeon, *Haemogregarina ascipenseris* (?) from, 513
in Tadpoles, transmission of, 121–2
Ticks, Hereditary infection in, by *Crithidia hyalommae*, 123–4
Toxoplasma, thesis on, referred to, 521
of Dogs, inoculation experiments with, 127–8
Natural infection with, 127, 520
Toxoplasma avium, 521
T. canis, experiments with, 128, 520–1
T. columbae, 128, 521
T. cuniculi, 127, 128, 521
T. gondii, 521
Notes on, 121, 127
Resistance powers of, extracorporeal, 520
T. liothricis, in *Liothrix luteus*, 511, 512
T. musculi, 521
T. pyrogenes, in spleen, in Ceylon case, 52
T. talpae, 521
Toxoplasmosis
Experimental, 127–8, 519–21
Trichomonads of mice and guinea-pigs, 517

Protozoology—*cont.*
Trichomonads—*cont.*
Trichomonas columbae in pigeons' livers, 124–5
Trichomonas cysts, in non-dysenteric patients, 514
Trypanoplasma gurneyorum from pike, 513
Trypansomes from, or in
Bycanistes albotibialis, 512
Cattle, 119
Equines, 119
Liothrix luteus, 511, 512
Rats, 119
Sheep, 119
Vertebrates, origination of, 516
Classification, &c., of, 514
Granule-shedding by, 126
Trypanosoma cazalboui in equines, 119
T. cruzi inoculation of guinea-pigs, 523
T. dendrocoeli, in flatworms, intracellular stage in, 125
T. denysi, 120
T. dimorphon, in equines, 119
T. inopinatum, synonyms for, 122
T. lewisi, in rats, 119, 120
Pulmonary cysts found with, 523
T. pecaudi, in donkeys, 119
Guinea-pig inoculation with; results, 523
T. remaki, var. *magna*, from pike, 512
T. rhodesiense infection of
Guinea-pig, 523
Rabbit, 524
T. rotatorium, in frogs and tadpoles
Infection by; results, 524
Transmission, 121, 122–3
Synonyms for, 122
T. talpae, in moles, 121,
Varanus niloticus, Haemogregarines of, 518–9

Pseudo Kala Azar, *see under* **MISCELLANEOUS.**

RAT-BITE DISEASE or **FEVER**, 229, 278–9
in China, 229
References to literature, xxxiii, lxxiv
Treatment by
Pot. Iod., 229
Quinine and acetyl salicylic acid, 278
Salvarsan, 279

RELAPSING FEVER, 1–20, 397–406
Argas as host of spirochaetes of, 13–6
Arsenic resistance of spirochaetes, 403–4
Bed-bugs as transmitters, 7, 16
Bilious form, fatality of (North Africa), 2
Bronchial form, 6
Diagnosis, spread, and symptoms, 7
Chemotherapy, 3, 19–20
in Children (Russia), 12
Chinese form, blood conditions in, 10
Diagnosis, 7
Drugs (*see under* Treatment), ineffective in Madagascar, 6
Epidemiology, 1, 2
Etiology, 10
European form, transmission by head-louse, 399
Experimental,
Action on, of
Benzol-sulphonic acid and azo-mercuric salicylate, 20
Emetine chlorhydrate, 20
Fluorescin-mercury, 20
Galyl and ludyl, 401
Quinine chlorhydrate, 20
in Java Sparrows, 13, 15
in Mice, 401
in Monkeys, 2, 4, 6, 7
Immunity to, experimental, 13
Incidence
Africa, East, 399
North, 1, 2, 3, 400
Tropical, 3, 4
West, 399
America, U.S., 13
Anglo-Egyptian Sudan, 6
China, 12
Congo, French, 398
First recorded case, 4
Europe, 399
India, 7 *et sqq.*, 398
Indo-China, 10, 397
Madagascar, 5
Russia, 12
Somaliland, British, 4, 5
Tonkin, 398
Form at, and high mortality, 10.
Tunis, 400
Epidemics of, 1, 2
Uganda, 342
Infection of (*see also* Transmission), through mucous membranes of eyes, 2
Insect vectors, *see under* Transmission

Relapsing Fever—*cont.*
Java sparrows in experiments with, 13, 15
Katanga Report on, 3
Lice as vectors, 2, 7, 11, 398–9
Mice in experiments with, 401
Monkeys in experiments with, 2, 4, 6, 7
Mortality from, 2, 8, 10
Prophylaxis, 11
Quetta form, 9
References to literature, xxv–vi, lxv
Seasonal variations in, 11
Spirillum infection, 13
Morphology of spirilla in, *ib.*
Spirochaetal action of serum of patients treated with salvarsan, 402–3
Spirochaetes of
Arsenic-resistance of, 403–4
Bacterial or protozoal nature of, studies on, 406
in Blood, 1
Detection, best method, 13
Temperature in relation to appearance of, 12
Branched forms, 406
Cultivation, 18
Differentiation, 6, 9
in *Hyalomma aegyptium*, 16
Biology of, 13–16
Indian Ink method of detection, 13
in Madagascar, 6
Morphology, comparative, 406
Staining methods, 13
in Ticks, location of, 13, 14, 16
Spirochaete anserina, identity with *S. gallinarum*, 400
S. dentium, 6
S. duttoni (*see also S. recurrentis*), 398
in Absence of spleen, 405
Action on, of
Galyl and ludyl, 401–2
Serum of salvarsan-treated patients, 402–3
Associated with "Tick fever" 3–4
Distribution and morphology of in experimentally-infected Ticks, 399-400
Filterability of, 404–5
One like, in B. Somaliland, 5
S. elusa, free-living and filterable, 405–6
S. gallinarum, 17
Action of, in splenectomised fowls, 405
Action on, of
Emetine chlorhydrate, 20
Mercury salts, 20
Organic antimony compounds, 19

Relapsing Fever—*cont.*
S. gallinarum—*cont.*
Action on, of—*cont.*
Quinine chlorhydrate, 20
and *Argas persicus*, 13–16, 400
Arsenic resistance of, 403
Behaviour at low temperatures, 405
Experimental studies on, 403
Identity with *S. anserina*, 400
Salvarsan resistance, 403
and Thyroid action, 18
S. kochi, distribution and morphology of, in experimentally infected ticks, 399–400
S. novyi, and body-lice, 398–9
S. recurrentis, 7, 8, 9, 10, 12
in Absence of spleen, 405
Arsenic resistance, 403
and Body-lice, 398–9
Cultivation, 18
Detection, 12
Experimental studies on, 403–4
Salvarsan resistance, 403
S. recurrentis group, and cross-immunisation, 15
Symptoms, 1, 2, 5, 7, 8, 9, 10, 12, 397
Temperature, bodily, as affecting Spirochaetes in blood, 12
"Tick fever" or, notes on, in Katanga, 3–4
Treatment, by salvarsan, 4
Ticks as vectors, 3–5, 13, 14, 15, 16, 398
Transmission
Experimental by
Java Sparrow, 13
Lice, 2
Monkeys, 4
Rats, 9
Ticks, 4, 13, 14, 15, 16
Natural, by
Bed-bugs, 7, 16
Bloodsucking insects, 11
Fleas, 11
Human carriers, 5, 7
Lice, 2, 7, 11, 398–9
Mosquitoes, 11
Ticks, 3–5, 398
O. moubata, 398, 399, 400
Treatment by
Antimony compounds, 3, 19, 400–1
Arsenical compounds, 3
Galyl, 3
Hectine, 3
Ludyl, 3
Mercury compounds, 401
Neo-salvarsan, 3, 397, 400, 401, 402
Salvarsan, 2, 3, 4, 6, 11, 12, 397, 398, 401,402 *et sqq.*

Relapsing Fever—*cont.*
SPIROCHAETOSIS, Animal, *see also* Experimental, Fowl, &c.
Fowl, action on, of
Emetine chlorhydrate, 20
Mercury salts, 20
Neo-salvarsan, 401
Quinine chlorhydrates, 20
Salvarsan, 401
Anaemia of, 16, 17
Blood in, morphology of, 17
Cross-immunisation experiments in, 15
Granule phase in, 15
Immunity after, 404
in the Sudan, 15
Spirochaete of, *see S. anserina, above*
Subsequent to splenectomy, 405
Thyroid action in relation to, 18
Transmission by Ticks
Experimental, 404
Natural, by *A. persicus*, 400
Human, *see under main heading*, Relapsing Fever
Spiroschaudinnia bronchialis, 6, 7

REPORTS, ANNUAL, &c.
Bombay Bacteriological Laboratory, on Cholera (1912), 112
British Guiana (1912–13), 349
Bacteriological Laboratory, Tropical Diseases Research (1912–13), 236
Ceylon (1913), 346
Anti-malarial Campaign, Kurunegala (1913), 151–3
Colonial Office Anti-Malarial Information Forms, 351–2
German Colonial Medical (1910–11), 176
Grenada, Yaws Hospital, 242
Hong Kong Bacteriological Institute, on local Mosquitoes (1913), 263
Jamaica, Bacteriological (1913), 226
Katanga, Scientific Mission of, 3
Malay States, Federated Medical Research Institute (1912 & 1913), 319
the same (1913) on Leprosy, 502
Nairobi Laboratory, (2), (1912), 234
Nigeria, Southern (1912), 333
North Manchurian Plague Prevention Service (1913), 202
Sierra Leone (1912), 335
Trinidad Leper Asylum (1913), 192

Reports, Annual, &c.—*cont.*
Uganda (1912), 342–6
Second, on Bionomics of *G. fuscipes* (1913), 41
Union of South Africa: Second, of Director of Veterinary Research, on Snake Bite (1913), 271–2
United States, Public Health Department, on Malaria in Arkansas (1914), 256
Windward Islands, on Hospitals &c., as to Yaws (1912–3) 241–2

REVIEWS OF BOOKS (*see also* **REPORTS**) 59–62, 117–8, 176–8, 234, 321–2, 392–6, 445–6, 507–10, 567–70
Ausgewandte Blutlehre für die Tropenkrankheiten (V. Schilling-Torgau), 567–70
Beriberi (Vedder), 332
Disease-Bearing Mosquitoes of N. and C. America, the W. Indies, and the Philippine Islands (Ludlow), 570
Dysenteries. Their Differentiation and Treatment (Rogers), 507
Flea, The. Cambridge Manuals No. 74 (Russell), 61
German Colonial Medical Reports (1910–11), 176–8
Handbuch der Tropenkrankheiten (Mense), 2nd ed., Vol. 2, 395
Health Preservation in West Africa (Ryan, introd. by Ross), 392
Importance in Pathology and Hygiene of Insects and Allied Arthropods, especially in relation to Disease (Goldi), 117–8
Lèpre La, à travers les Siècles et les Contrées (Zambaco), 508
Lessons in Elementary Tropical Hygiene (Strachan), 234
Malaria; Etiology, Pathology, Diagnosis, Prophylaxis and Treatment (Henson, introd. by Bass), 59
Nairobi Laboratory Reports, Jan.-June, 1912 (Small & Kirkham)
the same July-Dec. 1912. (Ross), 234
Plague and Pestilence in Literature and Art (Crawfurd), 567

Reviews of Books—*cont.*
Poisonous Terrestrial Snakes of our British Indian Dominions (including Ceylon) and how to Recognize them. With Symptoms of Snake Poisoning (Wall), 62
Text-book, A, of Medical Entomology (Patton & Cragg), 445
Tropenhygiene und ihre Probleme (Schüffner), 394
Tropischen Intoxikationskrankheiten, Die., 1. Vergiftungen durch pflanzliche Giften (Rho), 509
Ueber eine medizinische Studienreise nach Panama, West-Indien und den Vereinigten Staaten (Fülleborn), 393
Vitamines: their Physiological and Pathological Significance, especially with regard to the "Avitaminosen," Beriberi, &c. (Funk) 331

ROCKY MOUNTAIN SPOTTED FEVER, 230–2, 325
Arsenical dips for domestic animals, 325
Carbon bisulphide pumps, for tick eradication, 325
Dips for tick eradication, 325
Incidence, extent of, 325
Montana, 325
Prophylaxis, *see* Tick eradication 325
References to literature, lxxiv
Squirrels and, 325
Tick vector, *Dermacentor venustus*, 231
Eradication of
Arsenical dips for, 325
Sheep-grazing to control, 232, 325
Tick-paralysis caused by, 230-1

Sanitary Legislation, 383
Larvæ cases, 383
Rulings
Sierra Leone, 383
Uganda, 383
Sanitary works "to meet changing views," 387–8
Vital statistics in plague prevention, 383

Sanitation, *see* **Hygiene, Applied**, in Tropics, *and* **Sanitary Legislation**

SKIN DISEASES, TROPICAL (*see also* **LEPROSY**; **MISCELLANEOUS**, JUXTA-ARTICULAR NODULES; and **KALA AZAR**, TROPICAL SORE), 235-40
Actinomycosis, causes and pathology, 238, 239
Treatment, by Pot. Iod., 238
Ainhum, familial, Panama Canal zone, 240
Blastomycosis in
Brazil, 237
Tunis, 237
Cutaneous affections, Kamerun, 225
Dhobie's itch, *see* Tinea cruris
Granuloma pudendum in Tripoli, 235
Venereum, micro-organism of, 240
Leucoderma (pinta), 237
Madura Foot, incidence and pathology, 238-9, 336
Treatment
Copper sulphate, 238
Surgical, 238
X-ray, 238
Madurella, Algeria, and mycetomata, 238
M. mycetomi, 238, 239
M. tozeuri, 238
Mycetoma, causes, 238
Incidence
Algeria, 238–9
America, 239
Brazil, 239
French W. Africa, 239
Pathology, 238
Treatment, 238, 239
With invasion of Scarpa's triangle, 239
Parasites and Fungi associated with these diseases
Aspergillus genus, and mycetoma, 238
A. bouffardi, 238
Cohnistreptothrix israeli, and *thibiergei*, causing actinomycosis, 238
Diplococcus of granuloma venereum, 240
Epidermophyton cruris (or *inguinalis*) and *rubrum*, and Tinea cruris, 236
Indiella somaliensis and actinomycosis, 238
Madurella mycetomi, 238
Cultivation of, 239
M. tozeuri, 238
Micrococcus pyogenes, var. *tropicus*, source, 23
Nocardia, &c., causing actinomycosis, 238

Skin Diseases, Tropical—*cont.*
Parasites and Fungi &c.—*cont.*
Nocardia—*cont.*
N. asteroides (*Streptothrix freeri*), 238, 239
N. madurae, 238, 239
N. pelletieri, 238
Oidium lactis, one resembling, 237
Sterigmatocystis nidulans, and mycetoma, 238
Streptothrix freeri (*vel Nocardia asteroides*), 238
Experimental mycetoma from, 239
Vibrio, Cholera-like, in Yemen ulcer, 239
Zymonema brasiliense, source of, 237
Pian, Tripoli, 235
Pinta, true and other, 237
Pyosis, cutaneous, Tripoli, 235
Tropica, A. E. Sudan, 236.
References to literature, xxvii, lxvi–vii
Tinea cruris, incidence
Brazil, 237
British Guiana, 236
Philippine Islands, 236
Tripoli, 235
Treatment, by chrysophanic ointment, 236
Ulcus tropicum, Tripoli, 235
Yaws (*q.v.*), Tripoli, 235
Yemen Ulcer, cholera-like vibrio from, El Tor, 239

SLEEPING SICKNESS (and other Trypanosomiases), 21-46 164–76, 243–55, 407–30, 527–42
Antelopes and glossina, 42
as Hosts of trypanosomes, 245
Antigen properties of E. African trypanosomes, 415
Antiseptic action of metallic salts, studies on, 531
Barbeiro as vector of *T. cruzi* infection, 175
Bats, trypanosomes of
Afrique Mineure, 44
France, 169–70
Bed-bugs as vectors of *T. cruzi* infection, 425, 535
Buffalo, &c., trypanosomes like *T. vivax* from, 32
Cercopithecus patas, inoculation of, with *T. cazalboui*, 424
Chagas' Disease, *see T. cruzi* infection
Chemotherapy, 35, 167-8, 247 *et sqq.*, 410 *et sqq.*, 529 *et sqq.*
Chrysops genus as vectors, 30
Cimex boueti, and *lectularius*, infected by *T. cruzi*, 425

Sleeping Sickness—*cont.*
Cimex lectularius, as host of *T. cruzi*, 425, 535–6
Clearances, *see* Prophylactic measures
Conorhinus infestans, *megistus*, and *sordidus*, infected with *T. cruzi*, 425
Countries, &c., in which disease occurs, *see* Trypanosomiases, Animal, *and* Human, Incidence of
Culex decens, transmission experiments with, 244–5
Culex fascialus, transmission experiments with, 244–5
Cynocephalus, inoculation of, with *T. cazalboui*, 424
Dipterous parasite of *G. morsitans*, 427
Dogs, and *T. nigeriense*, 528
Dromedaries, Debab of, 254
Ghindi, Gobiat, and Salaf, of, 44–5
Drugs, medicaments, vaccines, etc., *see under* Treatment
Frogs, trypanosomes of, 45
Game and wild animals in relation to, 24, 25, 31–5, 42, 245, 246–7, 344–5, 421, 428
Gadflies, Chrysops genus as vectors, 30
Glossina, association of with the disease, 21
Breeding grounds of, 43
Cattle, and wild Game, 42, 246–7, 417, 421, 428
Clearances, and reduction of, 21, 165, 344, 427
Developmental cycle in, of trypanosomes, 26 *et sqq.*, 429
Distribution
British E. Africa, 248
German E. Africa 246
Nyasaland, 21, 246–7, 427
Portuguese E. Africa, 166
Rhodesia, 23–4, 246–7
Northern, 426–7
Uganda, 32, 41, 245
West Ashanti, 165–6
Food supplies, 42
Rail *versus* road in relation to, 166
Scratching birds and, 427
Transmission experiments with, Uganda, 33–4
G. brevipalpis, and Nagana, &c., 422
G. fusca, distribution of, in Ashanti, 165
British E. Africa, 428
Portuguese E. Africa, 166
Uganda, 34

Sleeping Sickness—*cont.*
Glossina—*cont.*
G. fusca—*cont.*
Effect on, of climatic conditions, 41, 43
Food supplies, 42, 43
Nocturnal habit, 428
Transmission experiments, 34
G. fuscipes (= *palpalis q.v.*), of Uganda, bionomics, 41
Sex proportion, 43
Transmission experiments with, 43
G. longipalpis (Ashanti), 165
Transmission experiments with, 27
G. longipennis, transmission experiments with, 27
G. morsitans, 418
Bionomics, 426 *et sqq.*
Dipterous parasite of, 427
Distribution in
German E. Africa, 246
Nyasaland, 427
Portuguese E. Africa, 166
Rhodesia, Northern, 23, 426, 427
Uganda, 34, 420, 421
and Game, 246–7
Not always infectious to man, 416
and Reptilian blood, 426
Risks from, Uganda, 420, 421
Suggestions for limitation and destruction of, 427
Transmission, natural and experimental by, 23, 27, 28, 418
G. nigrofusca, Ashanti, 165
G. pallicera, Ashanti, 165
G. pallidipes, distribution in
Portuguese E. Africa, 166
Uganda, 33, 34
Nocturnal habits, 428
Transmission experiments with, 33, 34
as Vector of animal trypanosomiases, 44–5
G. palpalis, 28, 245
Attempt to destroy by capture, 174–5
Distribution in
Ashanti, 165
German East Africa, 27
Rhodesia, Northern, 23
Sierra Leone, 243
Tanganyika, 175
Uganda, 245
West Africa, 243
and *T. gambiense*, 420
and *T. grayi*, 175
Transmission by, of *T. rhodesiense*, 26

Sleeping Sickness—*cont.*
Glossina—*cont.*
G. palpalis—*cont.*
Transmission experiments with, 27, 33
G. tachinoides, transmission experiments with, 27
Haematopinus spinulosus, *T. lewisi* transmission by, 404
Hippobosca as vector, Uganda, 34
Immunisation experiments with Nagana trypanosomes, 175, 252–3
Immunity of frogs to their trypanosomes, 45
Insect vectors, *see* Bed-bugs, Gadflies, Glossina, Hippobosca, Mosquitoes, Stomoxys, Tabanidae, Ticks, *see also* Transmission
Japan, new trypanosome from, 46
Leishmania associated with, classification of, 45
Lesions in general infection with *T. brucei*, 172
Lizards and Glossina, 42
Lung-fish and Glossina, 42
Mice, experimental trypanosomiasis in, 44
Inoculation of, with single trypanosomes, 429–30
Surra in, effect of "88," 412
Monitor and Glossina, 42
Monkeys, inoculation of, with *T. cazalboui*, 424
Mosquitoes as vectors, experiments with, 244–5
Ornithodorus moubata as host of *T. cruzi*, 425
Parasitic thyroiditis, *see T. cruzi* infection
Prophylactic measures, 21–2, 29, 165–6
in Nyasaland, 21–3
in Rhodesia, Northern, 23, 25
in Uganda, 25, 34–5
Rats, *T. lewisi* in, 44
and *T. nigeriense*, 528
References to literature, xxvii-xxxi lxxvii–lxxi
Rhipicephalus sanguineus as intermediate host of *T. cruzi*, 425
Rhodnius prolixus, as host of *T. cruzi*, 425
Stegomyia fasciata, transmission experiments with, 244–5
Stomoxys (*calcitrans* and *nigra*) as vectors, 29–30, 43
Tabanidae as vectors of Salaf, 45
Terebene-caused abscess and, 249–50
Ticks as hosts of *T. cruzi*, 425
as Vectors, experiments with, 175–6

Sleeping Sickness—*cont.*
Transmission
Experimental, *see* Glossina *and* Trypanosomes
Natural by
Glossina, *see that head*
Human carriers, 165, 166, 417–8
New roads, 166
Sexual intercourse, 29
Treatment, *see under* Trypanosomiasis, Animal, Experimental, and Human, *see also* Chemotherapy
Triatoma infestans, experimental infection of, with *T. equinum*, 30
Transmission by, of *T. cruzi*, 534–5
T. megista, transmission by, of *T. cruzi*, 30, 534–5
T. sordida, transmission by of *T. cruzi*, 30, 534–5
Triton pyrrhogaster, Japan, new trypanosome from, 46
Trypano-phagocytosis, mechanism of, 38
Trypanosomes
Action on, of
Mercury, 530
Rays, 414
Silver salts and compounds, 530–1
Trixidin, 533
Weak electric currents, 413–4
in Animals, diagnosis of, 244
of Bats, in France and Tunis, studies on, 44, 169–70
Biology of, mode of studying, 244
Causing Dourine, morphology of, 39–40
of Cattle, &c., Zululand, morphology of, 38–9
Classification, 45
Cultivation, 46, 541–2
Development in glossina, experiments and results, 26, *table*, 27
Three modes of, 429
Dimorphic, morphological change in, after passage through fly, 423
Distribution of, in Uganda, and in Zululand, 416
of Frogs, life cycle of, 45
in Game, 32, 245, 246–7, 417
Transmission experiments with, 32 *et sqq.*
of German East Africa, antigen properties of, 415
Human, *see T. nigeriense*, *T. gambiense*, *and T. rhodesiense*

Sleeping Sickness—*cont.*
Trypanosomes—*cont.*
Isolation of single ones, experiments on, 429–30
Lanfranchi's experiments on his own infection, 407–8
Location in *G. fuscipes*, 41
Mammalian, differentiation of the more important, 428–9
Pathogenicity or otherwise of, how established, 169, 541
Polymorphic, 539
with Short flagella, pathogenicity of, 423
Transmission experiments with and Glossina, 27–8
and *Stomoxys*, 29
T. brucei, action on of,
Rays, 414
Sieg's serum, 534
Trixidin, 533
Trypasafrol, 249
Differential studies on, and a human trypanosome, 246
Dimorphism of, researches on, 539–40
Forms resembling, from Uganda, 34
Zululand, 38–9
Immunisation experiments with, 252–3
Name of, suggested change, 416
Ocular lesions in, general infection with, 172
Transmission experiments with, 27
and *T. rhodesiense*, identity of (?) 171, 415–7
(Nagana ferox), and Nagana, 170, 253
Cultivation experiments with, 541, 542
Experimental researches on, 172–3
Experiments with by single Trypanosomes, 430
Immunisation experiments with, 174, 252–3
in Uganda, identity discussed, 170
Pecaudi type, with posterior nuclear forms, 171
of Uganda, 170, 249
Action on of
Atoxyl, 250
Terebene, 249, 250
T. of *Brucei-gambiense-pecaudi* group, from wild animals, 33

Sleeping Sickness—*cont.*
Trypanosomes—*cont.*
T. caprae, transmission experiments with, 27
Where developed in Glossina, 429
T. cazalboui, in Cattle, &c., 253, 423
Inoculation with, of, and from, Monkeys, 424
Transmission experiments with, 27
Where developed in Glossina, 429
T. cellii, morphology of, 44–5
T. confusum, identity of, with *T. congolense*, 169
T. congolense, action on of Trixidin, 533
Cultivation as affecting pathogenicity, &c., 423
Experiments with, 422
Others probably identical with, 169
Salient characters of, 428 & *table*
and *T. nanum*, probable identity of, 169, 254, 416
Where developed in Glossnia, 429
T. congolense Broden, features of, 423
T. cruzi
Infection of (Chagas' Disease or Parasitic Thyroiditis)
Incidence in Brazil, 30, 175, 254
Ovarian complications in, 36
Transmission by Reduviids, 425, 535
Triatoma, 30, 175, 254, 534–5
T. of Debab of Dromedaries, identity of, 254
T. diemyctuli, differentiation of, from *T. tritonis*, 46
T. of Dimorphic type, transmission experiments with, 27
T. dimorphon, action on, of silver salts, 531, 532
in Cattle and domestic animals, 253–4, 433, 540–1
Variation in infection of, 253–4
Differentiation of, from *T. cellii*, 45
Probably identical with *T. congolense*, 169
Rarely infective for Rats, 424
Transmission experiments with, 27

Sleeping Sickness—*cont.*
Trypanosomes—*cont.*
T. duttoni, and erythrophagocytosis, 26
Transmission experiments with, in mice, 44
T. equi, in Dourine, 40
T. equinum, action of trixidin, 533
in the Vinchuca, 30
T. equiperdum, 40
Action on, of
Trixidin, 533
Weak electric currents, 413–4
Cultivation experiments with, 541–2
and Dourine, 424
Virulence of, in laboratory form, 538
in Experiments with single trypanosomes, 430
T. evansi, 254
Action on, of
Arseno-silver compounds, &c., 37
Atoxyl, 250
Sieg's serum, 534
Silver salts, 531, 532
Terebene, 250
Trixidin, 533
Infection (*see* Surra), and abscess of fixation, 249.
in Rats, antigen from, 425
in Lanfranchi's laboratory, 408 *n.*
in *Tab. striatus* Fabr., 31
T. frobeniusi Weiss., features of, 423
T. gambiense, 245, 417, 429
Action on, of
Sieg's serum, 534
Silver salts, 532
Development in glossina, 28, 429
Dimorphism of, 540
Distribution of
Tanganyika shores, 527,
Victoria Nyanza shores, 527
Forms like, in game, &c. Uganda, 32, 33, 34, 43
and *G. palpalis*, 420
Infection in Mice, action in of silver salts, 532
Inoculation with, 168
in Irido-cyclitis case, 409
Pathogenicity of, compared with *T. nigeriense*, 528
Salient characters of, 428 & *table*
and *Stomoxys*, 30 *n.*
Transmission experiments with 27, 168, 244–5
and *T. rhodesiense*, identity of, 344

Sleeping Sickness—*cont.*
Trypanosomes—*cont.*
T. gambiense group, risks from Uganda, 420
T. grayi, in *G. palpalis*, Tanganyika, 175
T. of Human trypanosomiasis, German East Africa, comparative observations on, and *T. brucei*, 246
Transmission, experimental with mosquitoes, 244–5
T. inopinatum, synonyms for, 122
T. lagonostictae, n. sp., distribution, 430
T. lewisi, action on, of
Arsenic, 404
Iodine, bromine and osmic acid, 38
Staphylococcus vaccine, 38
Trixidin, 414
Weak electric currents, 414
Arsenic resistance of, modification of, 404
and Erythrophagocytosis, 26
Pathogenicity of, 542
in Rats, 44
Transmission of, 29
by *Haematopinus spinulosus*, effect on arsenic resistance, 404
T. liothricis, n. sp., source and distribution, 430
T. nanum, features of, 423
from Game, &c., 32, 33
Transmission experiments with, 27
and *T. congolense*, probable identity, 169, 254, 416
Where developed in Glossina, 429
T. nigeriense, distribution in Southern Nigeria, 528
and Erythrophagocytosis, 26
Pathogenicity of, 528
Transmission experiments with, and *Stomoxys*, 291
T. pecaudi in cattle, &c., 253, 423–4
Differentiation of, 40
Nomenclature, 416
Transmission experiments with, 27
and *T. ugandae*, 171
Where developed in Glossina, 429
T. pecorum, 39, 417
Features of, 423
Identity of, with *T. congolense*, 169
Transmission experiments with, 27
in Wild animals, 32, 33

Sleeping Sickness—*cont.*
Trypanosomes—*cont.*
T. rhodesiense, action on, of
Arseno-silver compounds, 37
Sieg's serum, 534
Silver salts, 531, 532
Trixidin, 533
Differentiation of, 40
Dimorphism in, 539, 540
Distribution in German East Africa, 420–1, 527
and Dourine, 40
in Game, &c., 24
Forms like, in game, &c.
German East Africa, 417
Uganda, 34
Identity with *T. brucei* discussed, 171, 415–7
with *T. gambiense*, 344
and Nagana, 170
Non-flagellar forms, in experimental animals, morphology of, 171
Salient characteristics of, 428 & *table*
Transmission experiments with, 26, 27, 244–5
Where developed in Glossina, 429
T. rotatorium, 191
Synonyms for, 122
T. simiae, transmission experiments with, 27
Where developed in Glossina, 429
T. soudanense, identity of, 254
T. theileri, cultivation experiments with, 541
in Experiments with single trypanosomes, 430
T. togolense, 407
T. tritonis, morphology of, 46
T. ugandae, action on, of
Sieg's serum, 534
Trixidin, 533
Differentiation of, 40
Nomenclature, 416
T. uniforme, from wild animals, 32, 33
Transmission experiments with, 27
Where developed in Glossina, 429
T. vespertilionis in Bats, in France, 169–70
T. vivax, action on, of
Iodine, bromine and osmic acid, 38
Trixidin, 533
Forms resembling, from buffalo, &c., 32
Large animals as hosts of, 420
in Rabbits, *see* Transmission

Sleeping Sickness—*cont.*
Trypanosomes—*cont.*
T. vivax, &c.—*cont.*
Salient characters of, 428 & *table*
Transmission experiments with, 27, 368–9, 424
Where developed in Glossina, 429
Tsetse-fly, *see* Glossina

Trypanosomiasis
Animal
Antibodies in blood, when treated by salvarsan, 173
Auto-erythrophagocytosis, in diagnosis of, 26
Bovines, action on, of virus of Ghindi, 45
in Cattle, Ashanti, 165
Chemotherapy, 247–8
Diagnosis by serum reactions, 536–8
in Frogs, and their immunity, 45
in Game and wild animals, 31–5, 416, 417–8
G. pallidipes as vector, 44–5
in Horses, with posterior nuclear forms, 170–1
and Immunity, 415
Incidence
Algeria, 254
France, 169–70
German East Africa, 249, 417–8, 421–3, 539
Gold Coast, 171
Italian Somaliland, 44
Ivory Coast, 421
Kamerun, 28
Luangwa region, 23–4
Nigeria, Northern, 170
Southern, 171, 333
Portuguese E. Africa, 171
Senegal, 44
Sierra Leone, 262
Uganda, 31–5, 419–21
Upper Niger, 254
Upper Senegal and Niger, 253
Zululand, 38
Mice with *T. evansi*, *rhodesiense* or *dimorphon* infection, action on, of silver salts, 532
Prophylaxis, 423–4, 427
Transmission
Experimental, 32 *et sqq.*
Natural, by
Glossina (q.v.), 44–5
Sexual intercourse, 29
Stomoxys, 45
Tabanidae, 45

Sleeping Sickness—*cont.*
Trypanosomiasis—*cont.*
Animal—*cont.*
Treatment by
Antimony compounds, 401
Salvarsan, 173
Terebene essence, 249
Trixidin, 249
Vaccines, 421–3

Debab, in Dromedaries, virus of, 254

Dourine
Diagnosis by
Complement fixation, 424–5
Serum reactions, 536–8
Transmission
Experimental, 538
Natural, 29
Treatment by antimony compounds, 401
Trypanosomes of, 407
Morphology of, 39–40

Ghindi, notes on, 44–5

Gobiat, notes on, 44–5

Mal de Caderas, Amazon region, 227
Capybara as host of parasite of, 227
Trypanosome of, transmission of, 30

Nagana, *T. brucei* (ferox) infection
Action on, of
Antimony compounds, 401
Atoxyl, 413
Human serum, 413
Mercury, 530
Salvarsan, 413
and Immunity, 415
Incidence
German E. Africa, 422–3
Uganda, 170
in Mice, action on, of mercury, 530
Immunity experiments with, 252–3
and Purification of mixed infection, 539–40
Neurological investigation in, 172–3
Paranagana, German East Africa, 423
T. brucei and, 170, 253
T. togolense of, 407

Sleeping Sickness—*cont.*
TRYPANOSOMIASIS—*cont.*
ANIMAL—*cont.*

SALAF OF DROMEDARIES, vectors of, 45

SURRA (*T. evansi* infection)
Action on, of
Abscess of fixation, in guinea-pigs, 249–51
"88" in Mice, 412
Transmission of mechanical, by *Tabanus striatus* Fabr., 311
Trypanotoxyl, formation of, 250

AVIAN, Japan, new Trypanosomes of, 430

EXPERIMENTAL
Action in, of
Abscess of fixation, 249–50
Aethylhydrocuprein, 530–1
Antimonial preparations, 247–8
Antimony trioxide, *see* Trixidin
Arsenobenzol, 37
Arsenosilver compounds, 37
Atoxyl, 249
Azotate of silver, 531
Benzidine, dyes of, 37
Bromine, 37, 38
Dioxydiaminoarsenobenzol, in combination with silver salts, 531–2
Eucerin ointment, 247, 248
Fluoresceine, 37
Iodine, 37, 38
Mehnarto's serum, 168
Mercury, alone and in combination with arsacetin, and with salvarsan, 530–1
Osmic acid, 37, 38
Quinine alkaloids, 533
Salts of metalloids and metals, 37
Salts of silver and compounds, 37, 531–2
Salvarsan, 173
Immunity experiments with, 252–3
Sieg's serum, 534
Staphylococcus vaccine, 37, 38
Trixidin, 247–8, 532–3
Trypan red, 37
with Silver salts, 532
Triphenyl-methane, 37
Tryposafrol, 249

Sleeping Sickness—*cont.*
TRYPANOSOMIASIS—*cont.*
EXPERIMENTAL—*cont.*
Antibodies in blood, in Salvarsan treatment, 173
Mouse-nagana, immunisation experiments with, 252–3
Nagana, action on, of quinine alkaloids, 533
Notes on changes from, 172
Trypanotoxins and immunisation experiments, 174
Symptoms no indication of trypanosome concerned, 429
in Various animals, 44, 244–5, 247–50, 252–4, 528
in Mice with single Trypanosomes, 429–30
Monkeys, 424
Rabbits, 424

HUMAN, in Antelopes, 415–6
Blood conditions in, 244
Case of laboratory infection: identification of virus, 407
Cerebrospinal fluid in, with Neosalvarsan treatment, 251–2
Clearances and, *see* Prophylaxis
Combined with malaria and syphilis, 527–8
Curability, 252
Diagnosis, by
Auto-erythrophagocytosis, 26
Complement deviation, 425
Epidemiology, 164–6
Game and wild animals in relation to, 24, 25, 31-5, 244,246–7,344–5,421,428
Incidence of infection
Afrique Mineure, 44
Angola, 528
Ashanti, 165
Brazil, 254
Congo, Belgian, 168, 243, 251, 527, 529
French, 35, 36, 409
French Equatorial Africa, 418–9
Gambia, 168
German East Africa, 166, 246, 417–8, 527
German West Africa
Kamerun South, 28
Italy, laboratory infection, 407
Luangwa valley, 415–6
Nigeria, Northern, 409
Southern, 333

Sleeping Sickness—*cont.*
TRYPANOSOMIASIS—*cont.*
HUMAN—*cont.*
Incidence of Infection—*cont.*
Nyasaland, 21, 166, 247, 418
Portuguese East Africa, 166, 418
Loanda, 408
Rhodesia, 166
Northern, 23, 426
Senegal, 410
Sierra Leone, 243, 336
Soudan, Southern, 168
Togoland, 164
Uganda, 25, 245, 342–5
Infection of, persistence of in tsetse fly and animal hosts, 527
Irido-cyclitis as early symptom of, 409
Isolation camps, German East Africa, 527
Lymphocytosis in, 251–2
Meningeal symptoms, 243–4, 251–2
Prophylactic measures, 25, 343, 344–5, 418–9, 420–1, 427, 527, 529
Recovery, in a female, 408–9
Symptoms, 243–4, 251–2, 409
Transmission by
Glossina, *see* Glossina
Traffic, 527
Treatment by
Antimony and antimonial preparations, 408-9, 411-2
Arsacetin, 530
Arsenophenylglycin, 164, 411, 529
Atoxyl, 23, 35, 164, 244, 409, 252, 530
with Mercury perchloride, 23
with Potassium emetic, 529, 530
Dye, B.S., 23
"Emétique d'Yvon," 530
Galyl and ludyl, 410–11.
Mercury perchloride and atoxyl, 23
Neosalvarsan, 164, 251–2, 411
Orpiment, 529
Salvarsan, 23, 36, 164, 251–2, 411, 527, 529
Salvarsankupfer ("K 3"), 167
Soamin, 23, 408–9, 530
Tartar emetic, 23, 408, 409
Trixidin, 411–2
Trypaflavin, 164
Tryparosan, 164, 530
Trypasafrol, 412, 530
Urotropin, 168

Sleeping Sickness—*cont.*
TRYPANOSOMIASIS—*cont.*
HUMAN—*cont.*
Trypanosomes of (*see T. gambiense, nigeriense & rhodesiense*
Villa lloydi, dipterous parasite of *G. morsitans*, 427
Viruses from human case developed from animal Trypanosomes (?), 407–8

Small Pox.
Incidence
Bengal, 360
Gold Coast, 374–7
Sierra Leone, 336
Prophylaxis, 360
Vaccination, and organization of vaccine departments, 374–7

SNAKE BITE, 266-72
Action of thrombin and thrombokinase on circulating blood plasma, 271
Antivenomous sera for *Echis carinata*, 268–9
Immunisation experiments with, 269–70
Incidence
England, 268
India, 268
South Africa, 271–2
References to literature, xxxiii, xxxvi, lxxiv
Symptoms, 266
Treatment
Adrenalin, 267
Alcohol, 267
Ammonia, 267
Anti-venene, 266, 267
Antivenomous sera, 268–9
Bleeding, 266
Boric acid, 267
Calcium, 267
Ligature, 266 *et passim*
Pituitrin, 267
Pot. permanganate, 266, 267, 268
Strychnia, 267
Viperine antiserum, 269–70
Various snakes
Adder, cure, 268
Cobra, cure, 266
Dose of venom given by single bite, 270
Crotalus, recovery, 267–8
Echis carinata
Antivenomous serum for, 268–9
Venom, coagulant of, nature of, 271
Dose given at single bite, 270–1

Snake Bite—*cont.*
Various snakes—*cont.*
Krait, cure, 266
South African snakes, experiments with, 271–2
Viperine antiserum, new mode of obtaining, 269–70

Splenomegaly, Febrile Tropical, *see under* **MISCELLANEOUS**; *see also* **MALARIA**

SPRUE, 94–5
References to literature, xxxiii, lxxiv
Symptoms, 94, 95
Treatment
Dietetic, 94, 95
Drug, 94, 95

Syphilis
Incidence
Tripoli, 235
Uganda, 342, 383
Prophylaxis, Uganda, 342, 383
Ruling *re*, Uganda, 383
Treatment
Galyl and ludyl, 402, 410
Serum of salvarsan-treated patients, 403
Treponema pallida
Action on, of galyl and ludyl, 402
Branched forms of, 406

TUBERCULOSIS, TROPICAL (among Native Races)
Incidence
British Guiana, 350
Nigeria, Southern, 333
Pathogenesis, diagnosis and prophylaxis, 220, 221, 228, 232–4
References to literature, lxxi

Typhoid Fever (Enteric)
Incidence
British Guiana, 350
India (army), 363
Indo-China (army), 363
Uganda, 342
United States and possessions (army), 363
Prophylaxis, 362–3
Transmission by
Ants (possible), 459
Human carriers, 363

TYPHUS FEVER, 563–6
Baths as preventives, 566
Blood conditions in, 565

Typhus Fever—*cont.*
Cutaneous eruption in, differentiated from that in typhoid fever, 564
Disinfection and disinfectants after, 565–6
Epidemics, *see* Incidence
Experimental, in men and monkeys, induced and spread by lice, 563–4
"Helios" apparatus for disinfection of clothes, etc., after, 566
House disinfection in Russia, 565–6
Incidence
Age and Sex, 564
Geographical
America, 564, 566
Balkan War area, 564
New Mexico, 564
Russia in Europe, 564
on Ships, 564
Lice as spreaders of hereditary infection, 563–4
in Man, induced and spread by lice-bites, 563
in Monkeys, induced and spread by lice-bites, 563
Prophylaxis, 564, 565, 566
References to literature, xxxi, lxxii
Serum complement deviation in, 565
Transmission by Lice, 564, 566
from Relapsing fever patient, 563
Treatment by Iodine, 565

Ulcerating Granuloma of pudenda, *see under* **MISCELLANEOUS**

Unclassed Fevers, *see under* **DENGUE,** *and* **FEVERS, UNCLASSED.**

UNDULANT FEVER, 210–19
Agglutination reaction in, 214 *et sqq.*
Blood conditions in, 213–4
Chemotherapy of, 219
Epidemiology, 210–4
Goats in relation to, 210, 211, 212, 213, 214, 215
Incidence
Algeria, 210–11
America, U.S., 213–4, 219
Corsica, 214, 217–8
France, 211
German S.W. Africa, 213
Italy, 211–3
Malta, 214
Morocco, 218
Uganda, 342

Undulant Fever—*cont.*
Inoculation experiments with, 218
Micro-organisms of
Micrococcus melitensis, 210, 211, 212, 213, 216, 217
Action on, of Copper Chlorides 219
of "606," 218
in Milk of London cows, 215–6
M. paramelitensis, 210, 211, 219
Para-melitensis fever, case of, 211
Polymorphonuclear leucocytosis in, 213–4.
Prophylaxis, 211, 212, 214, 218–9
References to literature, xxxii, lxxii
Salvarsan as affecting *M. melitensis*, 218
Serum agglutination in, 210–11, 212–3
Serum-diagnosis in, 216–7
Serum reactions in, 213, 214 *et sqq.*
Symptomatology, 211, 213, 217, 218
Transmission of, by
Animals, 210 *et passim*
Human carriers, 212, 213
Treatment by
Bacterial vaccines, 219
Collargol, 213
Copper chloride, 219
Pyramidon, 213
Serum, 218–9
Trambusti-Donzello's, 219
Wright's serum test in, 213

Venereal Diseases *see also* **Syphilis**
Ruling *re*, Uganda, 342

VERRUGA PERUVIANA, 142
References to literature, xxxiii, lxxiv

VOMITING SICKNESS, 184–6, 365
Diplococcus meningitidis in Jamaica, 185
in Jamaica, 184–6, 365
References to literature, xxxiii

White Race, The, and the Tropics, 220–5
Acclimatisation of, in
Cuba, 224
Philippines, 225
Climate, as affecting, 220, 222, 223, 224, 225
Invaliding of, causes
in Classes
Civil employees, &c., 222
Military forces, 222
Missionaries, 220–1, 222

White Race, &c.—*cont.*
Invaliding of, causes—*cont.*
in Countries
Africa, 221
British Guiana, 222
China, 220
Cuba, 224
India, 220, 222, 223
Philippine Islands, 224–5
Diseases and affections
Malarial, 220–3
Nervous, 220 *et sqq.*
References to literature, xxxiii–vi
Working powers of, as aided by electric fans, 326

YAWS, 235, 241–2
Incidence
Congo, French, 241
Java, 241
Sierra Leone, 336
South America, 227
Tripoli, 235
West Indies, 241, 242
Windward Islands, 241–2
References to literature, xxxii, lxxiii
Report of Yaws Hospital, Grenada, 242
Treatment by
Atoxyl, 242
Donovan's solution, 242
Joha, 242
Salvarsan, 241–2

YELLOW FEVER, 179–86
Blood in, conditions found, 183
Parasites in, 184
Cerebrospinal Meningitis, epidemic, in relation to, 185–6
Diplococcus meningitidis, in Jamaica, and, 185
Dogs as possible vectors, 184
Endemicity, 184, 365
Epidemic, in Senegal (1911–2), 182–3
Extinction of, suggestions for, 366
Extirpation from
Porto Rico, 228
West Indies, 180
Incidence, geographical
Jamaica, 184–5
Nigeria, Southern, 335, 365
Senegal, 182–3
Sierra Leone, 335, 336, 340, 365
South America, 179–82, 365
Guayaquil, &c., 365
West Africa, 183, 184, 335, 336, 340, 365
West Indies, 180
Seasonal, Jamaica, 185

Yellow Fever—*cont.*
Mosquitoes as vectors, *see Stegomyia*
Panama Canal opening in relation to, 179–82
Paraplasma flavigenum in, 184
Pathology, 183–4
Prophylaxis, 179–82, 365
References to literature, xxxii, lxxiii

Yellow Fever—*cont.*
Stegomyia as carriers
S. (*calopus*) *fasciata*, 184
Distribution of, 181, 182
S. scutellaris, 181
Reduction of, in Indian ports (considered), 179
Symptoms, 183
Transmission by
Dogs (possible), 184
Natives, 183
Stegomyia, 179, 181, 182, 184
Vomiting Sickness of Jamaica and, 184–6

REPORT TO THE MANAGING COMMITTEE

ON THE

LIBRARY

OF THE

TROPICAL DISEASES BUREAU.*

On the establishment of the Sleeping Sickness Bureau in June, 1908, the formation of a collection of the published papers dealing with trypanosomes and the diseases caused by them was at once begun as an aid to the Bureau's main work of collating and publishing information regarding sleeping sickness. The efforts put forward during the four years of the Bureau's existence resulted in the getting together of the nucleus of a general library on tropical diseases, besides a collection of papers relating to the trypanosomiases which, for its completeness, is perhaps unique.

At 1st July, 1912, on the expansion of the Sleeping Sickness Bureau into the Tropical Diseases Bureau, the Library contained about 350 bound volumes, mainly serial publications received in exchange for the *Sleeping Sickness Bulletin*, and some 1,500 reprints of papers. From that date the scope of the Library widened and the number of volumes has been more than trebled. The present position of the Library as regards the numbers of publications is shown below :—

Number of bound volumes	1,100
Number of reprints	2,100
Number of reports, Departmental Bulletins, unbound pamphlets, &c.	600

* Presented at a Meeting of the Managing Committee of the Tropical Diseases Bureau on April 22nd, 1914.

Serial publications.—The Library's main source of accession is the exchange of the Bureau' publications with other suitable publications. Some 50 periodicals were on the exchange list of the *Sleeping Sickness Bulletin*. With the commencement of the *Tropical Diseases Bulletin* and the *Tropical Veterinary Bulletin* this list was revised in November, 1912, a few exchanges being discontinued and many additional ones being obtained. At 31st December, 1913, 122 periodicals were in exchange with the *Tropical Diseases Bulletin* and 39 were in exchange with the *Tropical Veterinary Bulletin*.*

The Director will be glad to consider proposals for the exchange of the Bureau publications with other medical and scientific journals in which original papers on tropical diseases or parasitology are published.

The Bureau subscribes for the following periodicals :—

Archiv für Protistenkunde.
Beihefte z. Archiv für Schiffs- und Tropen-Hygiene.
Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris.
Centralblatt für Bakteriologie, 1. Abt. Originale.
Deutsche medizinische Wochenschrift.
Index Medicus.
Journal of Cutaneous Diseases, including Syphilis.
Journal of Hygiene.
Journal of Infectious Diseases.
Medicina Contemporanea (Lisbon).
Münchener medizinische Wochenschrift.
Parasitology.
Wiener klinische Wochenschrift.
Zeitschrift für Chemotherapie und verwandte Gebiete, Originale.
Zeitschrift für Hygiene und Infektionskrankheiten.
Zeitschrift für Immunitätsforschung und experimentelle Therapie, Originale.

The geographical distribution of the journals received is as follows :—

Europe.			
Great Britain ..	26	Belgium	2
Italy	20	Holland	2
France	17	Russia	1
Germany	16	Switzerland	1
Portugal	4	Spain	1
Austria	2	Greece	1
America.			
United States ..	31	Central America ..	4
South America ..	6	Canada	1
Asia.			
India	6	Indo-China	1
Dutch East Indies	2	Philippine Islands ..	1
China	1		
Africa.			
Union of South Africa,	2	Algiers	1
Egypt	1	Nyasaland Protectorate	1
Tunis	1	Mauritius	1
Australasia.			
Australia	2	New Zealand.. ..	1

The policy of completing the sets of the more important tropical journals in the Library by purchasing the earlier volumes has been adopted. The Bureau has now complete series of the following 46 publications. An asterisk marks those journals which are of more especial interest to workers on tropical medicine.

* A complete list of the periodicals received up to December 31, 1913, was printed in the *Tropical Diseases Bulletin*, Vol. 3, No. 1.

BRITISH EMPIRE.

*Annals of Tropical Medicine and Parasitology (Liverpool), 1907—
*Bulletin of Entomological Research (London), 1910—
Canadian Medical Association Journal (Toronto), 1912—
*Indian Journal of Medical Research (Calcutta), 1913—
Journal of Hygiene (Cambridge), 1901—
*Journal of the London School of Tropical Medicine (London), 1911—13.
*Journal of the Royal Army Medical Corps (London), 1903—
*Journal of Tropical Medicine and Hygiene (London), 1898—
*Journal of Tropical Veterinary Science (Calcutta), 1906—1912.
Lister Institute, Collected Papers (London), 1904—
Memoirs of the Department of Agriculture in India, Veterinary Series, 1913—
*Nyasaland Sleeping Sickness Diary (Zomba), 1909—
*Paludism (Simla), 1910—12.
Parasitology (Cambridge), 1908—
*Reports of the Sleeping Sickness Commission of the Royal Society (London), 1903—
Review of Applied Entomology (London), 1913—
Series A: Agricultural.
Series B: Medical and Veterinary.
*Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India, new series (Calcutta). 1902—1913.
*Yellow Fever Bureau Bulletin (Liverpool), 1911—

FOREIGN.

American Journal of Public Health (New York), 1911—
*American Journal of Tropical Diseases and Preventive Medicine (New Orleans), 1913—
*American Society of Tropical Medicine (Yearly volumes), 1904—
*Annales d'Hygiène et de Médecine Coloniales (Paris), 1898—
*Archiv für Schiffs- und Tropen-Hygiene, and Beihefte (Leipzig), 1897—
*Archives de l'Institut Pasteur de Tunis, 1906—
Archives of Internal Medicine (Chicago), 1908—
Archives de Parasitologie (Paris), 1898—
*Archivos de Hygiene e Pathologica Exoticas (Lisbon), 1905—
Archivos do Instituto Bacteriologica Camara Pestana (Lisbon), 1906—
*Boletin da Sociedade Brasileira de Dermatologia (Brazil), 1912—
Bulletin de l'Office Internationale d'Hygiène Publique (Paris), 1909—
*Bulletin de la Société de Pathologie Exotique (Paris), 1908—
Bulletin de la Société Portugaise des Sciences naturelles (Lisbon), 1907—
Folia Microbiologica (Delft), 1912—
Journal of Economic Entomology (Concord), 1908—
Journal of Experimental Medicine (New York), 1895—
*Mededeelingen van den Burgerlijken-Geneeskundigen Dienst in Nederlandsch-Indië, 1912—
*Memorias do Instituto Oswaldo Cruz (Brazil). (Rio de Janeiro, Manguinhos), 1909—
Pathologica (Genoa), 1908—
*Philippine Journal of Science. Section B. (Tropical Medicine), 1906—
Proceedings of the Society for Experimental Biology and Medicine, (1904—)
*Revue de Médecine et d'Hygiene Tropicales (Paris), 1904—
Texas State Journal of Medicine (Fort Worth), 1905—
United States War Department Bulletin (Washington), 1913—
Zeitschrift für Chemotherapie und verwandte Gebiete. 1. Teil. Originale (Leipzig), 1912—
Zeitschrift für Immunitätsforschung und experimentelle Therapie, Originale (Jena) 1908—

Lacunæ.—Efforts to complete some sets of the serial publications have been fruitless owing to the earlier numbers being out of print and unprocurable from the publishers. In these cases the Bureau can now only hope to obtain the missing parts through the secondhand booksellers or by presentation. Some of these lacunæ are noted below :—

Bulletin de la Société Médico-Chirurgicale de l'Indo-Chine, 1911. Vol. 2, Nos. 3, 6, 7, and 8, and Title-page and Index.
Geneeskundig Tijdschrift voor Nederlandsch-Indië. Volumes 1 to 40: and 1901. Volume 41. Part I.
Indian Medical Gazette, Volumes 1 to 33, and the following numbers, viz.—1899: Vol. 34, Nos. 1 and 7-11. 1900: Vol. 35, Nos. 2-4, 6-7, and 9-12. 1901: Vol. 36, Nos. 1-7, 9, and 12. 1902: Vol. 37, Nos. 4 and 10. 1903: Vol. 38, Nos. 1, 3, 5-12. 1904: Vol. 39, Nos. 1-3, and 9-12. 1905: Vol. 40, Nos. 1-3. 1906: Vol. 41, Nos. 9 and 10. 1907: Vol. 42, Nos. 4 and 9. 1908: Vol. 43, No. 8. 1909: Vol. 44, No. 6. 1910: Vol. 45, Nos. 2 and 3. 1912: Vol. 47, Nos. 5 and 10 and Indices to Vols. 36, 38, 39 and 40.
Malaria e Malattie dei Paesi Caldi. 1911. Vol. 2, Nos. 4 and 6.
Memoirs of the Liverpool School of Tropical Medicine. Nos. 8 and 9.
Records of the Egyptian Government School of Medicine, Cairo. Vol. 1.
Southern Medical Journal. Vols. 1 to 3, and 1911. Vol. 4, Nos. 7 and 12; 1912. Vol. 5, Nos. 9 and 12.
United States Naval Medical Bulletin. 1907. April, Vol. 1, Nos. 1 and 4; 1908. January, Vol. 2, No. 1; 1911. April, Vol. 5, No. 2.

In the case of some other important publications, such as the *Annales de l'Institut Pasteur*, Paris, the *Archiv für Protistenkunde*, and the *Centralblatt für Bakteriologie*, 1. Abt. Originale, which would be of great value to the Library, the cost of obtaining the back volumes has so far proved prohibitive.

Books.—For the acquisition of current books the Library mainly depends on presentation or on the receipt of copies for review in the *Bulletins*. The medical publishers are applied to for copies of suitable books, and these books, after review, are placed in the Library. About 50 of the most recent books on tropical diseases have thus been acquired. As the reviews in the *Bulletins* become more widely known and quoted an increasing number of books will probably be received for review, and for a subsequent place in the Library.

In addition to books purchased on the recommendation of the Sectional Editors, some of the more important reference books and standard works have been bought.

The following are some of the more important **recent books** that have been added to the Library :—

Laveran & Mesnil: Trypanosomes et Trypanosomiases, 2 edit. (Paris.)
Roberts (Stewart R.): Pellagra. History, Distribution, Diagnosis, Prognosis, Treatment, Etiology. (London.)
Wood: A treatise on Pellagra for the General Practitioner. (New York and London.)
Herms: Malaria: Cause and Control. (New York.)
Besson: Practical Bacteriology, Microbiology and Serum Therapy. (London.)
Hoare: A System of Veterinary Medicine. By various writers. (Vol. I.) (London.)
Gesammelte Werke von Robert Koch (3 vols.). (Leipzig.)

v. PROWAZEK: Handbuch der Pathogenen Protozoen. Lief 1-5. (Leipzig.)
CRALL & CLARAC: Traité Pratique de Pathologie Exotique (5 vols.). (Paris.)
In Onore del Prof. Angelo CELLI nel 25° Anno Insegnamento. (Turin.)
HAFFKINE (W. M.): Protective Inoculation against Cholera. (London.)
MENSE: Handbuch der Tropenkrankheiten. 2 edit. (2 vols.). (Leipzig.)
Medizinal-Berichte über die Deutschen Schutzgebiete für das Jahr, 1910-11. (Berlin.)
GRAHAM-SMITH: Flies in Relation to Disease. Non-Bloodsucking Flies. (Cambridge.)
RODHAIN, PONS, VAN DEN BRANDEN, & BEQUAERT: Rapport sur les Travaux de la Mission Scientifique du Katanga (Octobre, 1910, à Septembre, 1912). (Brussels.)
HENSON: Malaria: Etiology, Pathology, Diagnosis, Prophylaxis and Treatment. (London.)
ROGERS: Dysenteries: Their Differentiation and Treatment. (London.)
WALL: The Poisonous Terrestrial Snakes of our British Indian Dominions (including Ceylon) and how to recognize them, with Symptoms of Snake Poisoning and Treatment. (Bombay.)
VEDDER: Beriberi. (London.)
PATTON & CRAGG: A Text Book of Medical Entomology. (London, Madras and Calcutta.)
ZAMBACO PACHA: La Lèpre à travers les Siècles et les Contrées (Anthologie). (Paris.)
BAERMANN (G.) & ECKERSDORFF (O.): Atlas tropische Darmkrankheiten. (Leipzig.)
TURNER (J. A.): Sanitation in India. (Bombay.)
NEUMANN (R. O.) & MAYER (Martin): Atlas und Lehrbuch wichtiger tierischer Parasiten und ihrer Ueberträger mit besonderer Berücksichtigung der Tropenpathologie. (Munich.)
GAIT (E. A.) Census of India, 1911, Vol. I, Parts 1 & 2. (Calcutta.)

Reprints.—With the growth in the number of serials received in the Library, the Bureau has become independent of other medical libraries, so far as the journals on tropical medicine are concerned, but as other medical journals occasionally publish papers on exotic diseases, the Libraries of the Royal College of Surgeons and Royal Society of Medicine are visited fortnightly so that a systematic watch may be kept on the contents of journals which are not received at the Bureau. The titles of papers thus found are noted and the authors are written to for reprints. In this way the reprints in the Library are steadily being added to, and since July, 1912, over 500 have been collected and filed.

Reports.—Steps have also been taken by means of letters addressed to the various Medical and Sanitary Departments to make the Library's collection of official Annual Medical and Sanitary Reports from the tropical colonies and from India more complete.

Medical Officers of Health will be rendering a valuable service to the Bureau if they will forward copies of their Reports to the Library.

Donations.—The Bureau is indebted to Lieutenant-Colonel J. H. Tull Walsh, Mrs. Frederic Bagshawe, the late Surgeon-General Sir A. M. Branfoot, Lieutenant-Colonel W. J. Buchanan, I.M.S., Dr. A. G. Bagshawe, Dr. G. C. Low, and others, for donations of books and periodicals. By these gifts the Bureau has become

possessed of some rare works on tropical medicine which otherwise might have been unobtainable, and it is greatly to be hoped that the Library may continue to receive such valuable benefactions.

Exchanges of Duplicates.—Exchanges of Duplicates have been arranged with the London School of Tropical Medicine, and some duplicates from the British Medical Association Library have been received *in lieu* of an annual subscription to the *Tropical Diseases Bulletin*.

The Bureau possesses a considerable collection of duplicate publications relating to tropical diseases, and proposals for exchange with other libraries would be willingly entertained.

Catalogues.—The catalogues of the Library are kept on the card system. Besides the general catalogue of periodical publications and books, a subject catalogue, containing the titles of the individual papers on tropical diseases printed in the various journals, is being made. This catalogue is arranged under the names of the diseases, the individual entries within these divisions being filed alphabetically under authors' names.

Accommodation.—The room in which the Library is now housed has shelving space for between 1,200 and 1,300 books. Already the Library has nearly outgrown this space, and want of additional shelving accommodation therefore becomes an urgent necessity.

General.—The Library exists primarily as an aid to the preparation of the Bureau publications, and its chief aim therefore has been to keep abreast of the current literature on tropical diseases. In this the Bureau has been so far successful that over 80 per cent. of the original papers summarized in the *Bulletins* are to be found in the Library. There are unfortunately some countries (*e.g.*, Russia and Japan, from each of which only one exchange has been obtained) of which the published work on tropical diseases is still very inadequately represented. On the other hand, several of the exchanges (more especially from Central and South America) are not accessible, so far as is known, in any other of the medical libraries in London.

The Library is open to all comers. It is at present mainly used by the Sectional Editors, who freely avail themselves of the facilities for borrowing the journals and books in connexion with their work. Of a necessity, many medical men interested in the study of tropical diseases reside abroad, and the number of potential users of the Library in England is limited. As the Library grows, and its convenience becomes better known, an increasing number of medical officers home on leave from the tropics are likely to make use of it.

R. L. SHEPPARD,
Librarian.

6th April, 1914.

TROPICAL DISEASES BUREAU,
IMPERIAL INSTITUTE, S.W.

TROPICAL DISEASES BUREAU LIBRARY.

The following periodicals are received in the Bureau Library.

NOTE.—The date and volume number following the title indicate the earliest volume of the series which the library possesses. Dashes after the date and volume number indicate that the intervening parts (unless otherwise stated) are complete to the date of publication of this list.

Series which are complete from the commencement are marked with an asterisk.

EUROPE.

GREAT BRITAIN.

*Annals of Tropical Medicine & Parasitology (Liverpool)	1907—	Vol. 1—
British Medical Journal (London) ...	1876—	
*Bulletin of Entomological Research (London)	1910—	Vol. 1—
Edinburgh Medical Journal	1908—	Vol. 1—
Glasgow Medical Journal	1909	Vol. 71—
Journal of the Board of Agriculture (London)	1913—	Vol. 20—
Journal of Comparative Pathology & Therapeutics (Edinburgh & London)	1901—	Vol. 28—
*Journal of Hygiene (Cambridge) ...	1901—	Vol. 1—
*Journal of the London School of Tropical Medicine (London) ...	1911–13	Vols. 1–2 (publication ceased)
Journal of Pathology & Bacteriology (Cambridge)	1907—	Vol. 12—
*Journal of the Royal Army Medical Corps (London)	1903—	Vol. 1—
Journal of State Medicine (London)...	1913—	Vol. 21—
*Journal of Tropical Medicine & Hygiene (London)	1898—	Vol. 1—
Lancet (London)... ... 1888–1902,	1908—	
*Lister Institute. Collected Papers (London)	1904—	Vol. 1—
*Parasitology (Cambridge)	1908—	Vol. 1—
Proceedings of the Royal Society, Series B. (London)	1905—	Vol. 76—
Public Health (London)	1908—	Vol. 22—
*Reports of the Sleeping Sickness Commission of the Royal Society (London)	1903—	No. 1—
*Review of Applied Entomology. Series A: Agricultural. Series B: Medical & Veterinary (London)	1913—	Vol. 1—
*Transactions of the Society of Tropical Medicine & Hygiene (London) ...	1907—	Vol. 1—
Veterinary Journal (London)... ...	1910—	Vol. 66—
Veterinary News (London)	1910—	Vol. 7—
Veterinary Record (London)	1913—	Vol. 26—
*Yellow Fever Bureau Bulletin (Liverpool)	1911—	Vol. 1—

FRANCE.

*Annales d'Hygiène et de Médecine Coloniales (Paris)	1898—	Vol. 1—
Annales de l'Institut Pasteur (Paris)	1909—	Vol. 23—
Archives de Médecine et Pharmacie Militaires (Paris)	1914—	Vol. 63—
Archives de Médecine et Pharmacie Navales (Paris)	1907—	Vol. 88—

FRANCE—*continued.*

*Archives de Parasitologie (Paris) ...	1898—	Vol. 1—
Bulletin de l'Institut Pasteur (Paris)	1909—	Vol. 7—
*Bulletin de l'Office International d'Hygiène Publique (Paris)... ...	1909—	Vol. 1—
*Bulletin de la Société de Pathologie Exotique (Paris)	1908—	Vol. 1—
Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris ...	1913	(3 ser.) Vol. 29—
Le Caducée (Paris)	1913—	Vol. 13—
Comptes Rendus de la Société de Biologie (Paris)	1912—	Vol. 72—
Gazette des Hôpitaux Civils et Militaires (Paris)	1914—	Vol. 87—
Recueil de Médecine Vétérinaire (Alfort)	1913—	Vol. 90—
Répertoire de Police Sanitaire Vétérinaire (Paris)	1913—	Vol. 29—
*Revue de Médecine et d'Hygiène Tropicales (Paris)	1904—	Vol. 1—
Revue Générale de Médecine Vétérinaire (Toulouse)	1913	Vol. 21—
Revue Vétérinaire (Toulouse)... ...	1913—	Vol. 38—

GERMANY.

Arbeiten aus dem Kaiserlichen Gesundheitsamte (Berlin)	1913—	Vol. 43—
Archiv für Protistenkunde (Jena) ...	1913—	Vol. 30—
*Archiv für Schiffs- und Tropen-Hygiene [& Beihefte] (Leipzig)	1897—	Vol. 1—
Centralblatt für Bakteriologie. (Jena.)		
1. Abteilung. Originale	1912—	Vol. 65—
Referate	1909—	Vol. 43—
Deutsche Medizinische Wochenschrift (Berlin)	1909—	Vol. 35—
Deutsche Militärärztliche Zeitschrift (Berlin)	1910—	Vol. 39—
Deutsche Tierärztliche Wochenschrift (Hanover)	1913—	Vol. 21—
Lepra (Leipzig)	1913—	Vol. 14—
Mitteilungen aus dem Zoologischen Museum in Berlin	1910—	Vol. 4—
*Zeitschrift für Chemotherapie und verwandte Gebiete. 1. Teil., Originale (Leipzig)	1912—	Vol. 1—
Zeitschrift für Hygiene und Infektionskrankheiten (Leipzig)	1912—	Vol. 72—
Zeitschrift für Veterinärkunde (Berlin)	1913—	Vol. 25—

ITALY.

Annali d'Igiene Sperimentale (Turin)	1912—	Vol. 22—
Annali di Medicina Navale e Coloniale (Rome)	1908—	Anno 14—
Atti della Società per gli Studi della Malaria (Rome) 1907,	1909—	Vols. 8, 10—
Bollettino delle Sedute della Accademia Gioenia di Scienze Naturali in Catania	1911—	Part 19—
Clinica Veterinaria (Milan)	1913—	Vol. 36—
Gazzetta Internazionale di Medicina, Chirurgia, Igiene, &c. (Naples) ...	1913—	
Giornale della R. Accademia di Medicina di Torina	1912—	Vol. 75—
Giornale della Reale Società Italiana d'Igiene (Milan)	1913—	Vol. 35—
Giornale di Medicina Veterinaria ...	1913—	Vol. 62—

ITALY—*continued.*

Malaria e Malattie dei Paesi Caldi (Rome)	1912—	Vol. 3—
Moderno Zooiatro (Bologna) Parte professionale	1913—	
• Parte scientifica	1913—	
Nuovo Ercolani (Pisa)	1913—	Vol. 18—
*Pathologica (Genoa)	1908—	Vol. 1—
Pediatria (Naples)	1913—	Vol. 21—
•		(Ser. 2. Vol. 11—)
Policlinico (Rome) ... Sez. medica	1912—	Vol. 19—
Sez. pratica	1912—	Vol. 19—
Propaganda Antimalarica (Naples) ...	1911—	Vol. 4—
Riforma Medica (Naples)	1912-13	Vols. 28-29
Rivista Pellagrologica Italiana (Udine)	1913—	Vol. 5. No. 5—
Lo Sperimentale (Florence)	1913—	Vol. 67—

AUSTRIA.

Das Oesterreichische Sanitätswesen (Vienna)	1913—	Vol. 25—
Wiener Klinische Wochenschrift ...	1913—	Vol. 26—

RUSSIA.

Archives des Sciences Biologiques (St. Petersburg)	1914—	

BELGIUM.

Annales de Médecine Vétérinaire (Ixelles-Brussels)	1913—	Vol. 62—
Bulletin de l'Académie Royale de Médecine de Belgique (Brussels) ...	1908—	(4 ser.) Vol. 22—

HOLLAND.

Janus (Leyden)	1909—	Vol. 14—
Folia Microbiologica (Delft)	1913—	Vol. 2—

SPAIN.

Boletin del Instituto Nacional de Higiene de Alfonso XIII (Madrid)	1913—	Vol. 9—

PORTUGAL.

*Archivos de Hygiene e Pathologia Exoticas (Lisbon)	1905—	Vol. 1—
*Archivos do Instituto Bacteriologica Camara Pestana (Lisbon)	1906—	Vol. 1—
*Bulletin de la Société Portugaise des Sciences Naturelles (Lisbon) ...	1907—	Vol. 1—
Medicina Contemporanea (Lisbon) ...	1913—	Vol. 31—

SWITZERLAND.

Schweizer Archiv für Tierheilkunde (Zurich)	1913—	Vol. 55—

GREECE.

La Grèce Médicale. (Ἰατρικὴ Πρόοδος) (Athens)	1912—	Vol. 15—

AMERICA.

CANADA.

*Canadian Medical Association Journal (Toronto)	1912—	Vol. 1—

UNITED STATES.

*American Journal of Public Health (New York)	1911—	Vol. 1—
*American Journal of Tropical Diseases and Preventive Medicine (New Orleans)	1913—	Vol. 1—
American Journal of Veterinary Medicine (Chicago)	1913—	Vol. 8—

UNITED STATES—*continued.*

*American Society of Tropical Medicine	1904—	Vol. 1—
*Archives of Internal Medicine (Chicago)	1908—	Vol. 1—
Bureau of Animal Industry Bulletins (Washington)	1908—	[Incomplete]
Hygienic Laboratory Bulletins (Washington)	1908—	[Incomplete]
Index Medicus (Washington) ...	1912—	2 ser. Vol. 10—
Interstate Medical Journal (St. Louis)	1913—	Vol. 20—
Journal of the American Medical Association (Chicago)	1910—	Vol. 54—
Journal of Cutaneous Diseases including Syphilis (New York)	1913—	Vol. 31—
Journal of Economic Entomology (Concord)	1913—	Vol. 6—
*Journal of Experimental Medicine (New York)	1895—	Vol. 1—
Journal of Infectious Diseases (Chicago)	1913—	Vol. 13—
Kentucky Medical Journal	1914—	Vol. 12—
Military Surgeon (Washington) ...	1913—	Vol. 33—
New Orleans Medical & Surgical Journal	1912—	Vol. 65—
New York Medical Journal	1910—	Vol. 91—
Proceedings of the United States National Museum (Washington) ...	1879—	[Incomplete]
Public Health Reports (Washington)	1909—	Vol. 24—
Public Health Bulletins (Washington)	1908—	[Incomplete]
Southern Medical Journal (Nashville, Tenn.) ... (1911, 1912 incomplete)	1913—	Vol. 6—
Studies from the Zoological Laboratory. University of Nebraska	1909—	
Texas State Journal of Medicine (Fort Worth)	1913—	Vol. 8—
United States Naval Medical Bulletin (Washington) 1909, 1910,	1912—	Vols. 3, 4, Vol. 6—
*United States War Department Bulletin (Washington)	1913—	No. 1—
University of California (Berkeley):		
Publications in Pathology	1903—	Vol. 1—
Publications in Zoology	1908—	Vol. 6—
University of Kansas (Lawrence) Science Bulletin	1913—	

CENTRAL AMERICA.

Proceedings of the Canal Zone Medical Association (Mount Hope, C.Z.) ...	1909—	Vol. 2—

SOUTH AMERICA.

Archivos Brasileiros de Medicina ...	1914—	Vol. 4—
*Boletin da Sociedade Brasileira de Dermatologia	1912—	Vol. 1—
Brazil-Medico	1914—	Vol. 28—
*Memorias do Instituto Oswaldo Cruz (Rio de Janeiro-Manguinhos) ...	1909—	Vol. 1—
Revista Medica de S. Paulo (S. Paulo)	1912—	Vol. 15—
La Semana Médica (Buenos Ayres) ...	1913—	Vol. 20—

ASIA.

INDIA.

*Indian Journal of Medical Research (Calcutta)	1913—	Vol. 1—
Indian Medical Gazette (Calcutta)	1896-1908	Vols. 31-43 [incomplete]
	1909—	Vol. 44—
Medical Missions in India (Pokhuria)	1912—	Vol. 18—

INDIA—*continued.*		
*Memoirs of the Department of Agriculture in India. Veterinary Series	1913—	Vol. 1—
*Paludism (Simla)	1910–1912	Nos. 1–5 [publication ceased]
*Scientific Memoirs by Officers of the Medical & Sanitary Departments of the Government of India (Calcutta)	1902—	(New ser.) No. 1—
JAPAN.		
Sei-i-Kwai Medical Journal	1913—	Vol. 33—
CHINA.		
China Medical Journal (Shanghai) ...	1912—	Vol. 26—
EAST INDIAN ARCHIPELAGO.		
Geneeskundig Tijdschrift voor Nederlandsch-Indië (Rijswijk-Batavia) ...	1901—	Vol. 42—
*Mededeelingen van den Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indië	1912—	Vol. 1—
*Philippine Journal of Science, Section B. Philippine Journal of Tropical Medicine (Manila)	1906—	Vol. 1—
INDO-CHINA.		
*Bulletin de la Société Médico-Chirurgicale de l'Indochine (Hanoi & Haiphong)	1910—	Vol. 1—
MAURITIUS.		
Bulletin de la Société Médicale de l'Ile Maurice	1908	(2 ser.) Nos. 14–22— (3 ser.) No. 23—
AFRICA.		
*Archives de l'Institut Pasteur de Tunis	1906—	Vol. 1—
Medical Journal of South Africa [formerly Transvaal Medical Journal] (Johannesburg)	1913—	Vol. 9—
*Nyasaland Sleeping Sickness Diary (Zomba)	1909—	No. 1—
Records of the Egyptian Government School of Medicine (Cairo)	1904—	Vol. 2—
South African Medical Record (Cape Town)	1910—	Vol. 8—
AUSTRALASIA.		
AUSTRALIA.		
Australasian Medical Gazette (Sydney)	1913—	Vol. 33—
Australian Medical Journal (Melbourne)	1913—	(New ser.) Vol. 2—
NEW ZEALAND.		
New Zealand Medical Journal... ...	1913—	Vol. 12. No. 45—

NOTE.—The Director would consider proposals for the exchange of the Bureau publications with other medical and scientific journals in which original papers on tropical diseases or parasitology are published.

LIST OF REFERENCES.

Compiled by R. L. SHEPPARD, Librarian of the Bureau.

[Continued from BULLETIN, Vol. 2, pp. xxxv-lxv.]

AMOEBIASIS (including Entamoebic Dysentery and Liver Abscess.)

AKASHI (M.). Studien über die Morphologie und Entwicklung der *Entamoeba coli* Lösch emendata Schaudinn in Japan.—*Beihefte z. Arch. f. Schiffs- u. Tropenhyg.*, 1913. Nov. Vol. 17: Beiheft 8. pp. 5–18. [pp. 461–474.] With 2 plates.

——. Studien über die Ruhramöben in Japan und Nordchina—*Beihefte z. Arch. f. Schiffs- u. Tropenhyg.*, 1913. Nov. Vol. 17. Beiheft 8. pp. 19–43. [475–499.] With 2 plates.

des BARRES (Leroy). Amibiase intestinale et Abcès du Foie. Traitement par l'Emétine et l'Ouverture de l'Abcès. (Rapport de M. H. Morestin).—*Bulls. et. Mems. Soc. de Chirurgie de Paris*, 1913. Nov. 18. Vol. 39. No. 34, pp. 1429–1435.

BAUR (Jean) & PLISSON (L.). Grand Abcès du Foie d'Origine dysentérique, Traité par la Ponction évacuatrice et des Injections d'Emétine. Bulle gazeuse intrahépatique. Guérison.—*Bulls. et Mems. Soc. Méd. des. Hôp. de Paris*, 1913. Nov. 13. (33e sér.) Vol. 29. No. 32, pp. 478–498. With 4 figs.

BIZARD. Sur l'Emploi de l'Emétine dans le Traitement de la Dysenterie Amibienne et de l'Hépatite.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 264–267.

BOND (Ashton). Church Missionary Society Hospital, Toro, Uganda. An Unusual Case of Tropical Liver Abscess.—*Brit. Med. Jl.* 1913. Dec. 13, pp. 1536–1537.

BRAU (P.). Amibiase intestinale.—Diarrhée noire.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 567–569.

BRELET (M.). Traitement de la Dysenterie amibienne, de l'Hémoptysie et des autres Hémorragies par l'Emétine.—*Gaz. des Hopit. Civils et Militaires*, 1913. Dec. 23. Vol. 86. No. 146, pp. 2318–2320.

CARINI (A.). O Chlorhydrato de Emetina no Tratamento da Dysenteria e da Hepatite Amebianas.—*Annaes Paulistas de Med. e Cirurgia*, 1913. Oct. Vol. 1. No. 3, pp. 75–81.

CANTLIE (James). Hepatic Abscesses which open upwards through the Lung.—*Jl. Trop. Med. & Hyg.*, 1913. Nov. 15. Vol. 16. No. 22, pp. 345–347. With 2 text figs.

CLOUD (R. E.). A Case of Amebic Dysentery treated with Emetin Hydrochlorid.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 22. Vol. 61. No. 21, p. 1899.

COURET (Maurice) & WALKER (James). The Cultivation of Amoebae in Pure Culture upon Autolyzed Tissues.—*Jl. Exper. Med.*, 1913. Sept. 1. Vol. 18. No. 3, pp. 252–258.

CRAIG (Charles F.). The Classification of Amoebae, with Special Reference to the Parasitic Species.—*Amer. Jl. Trop. Diseases & Preventive Med.*, 1913. Nov. Vol. 1. No. 5, pp. 351–361.

DARLING (S. T.). Notes on the Life History and Viability of *E. tetragena*.—*Proc. Canal Zone Med. Assoc.* for half year April to Sept., 1912. Vol. 5. Pt. 1. pp. 67–71.

DOPTER. Le Chlorhydrate d'Emétine dans le Traitement de l'Amibiase.—*Bull. Acad. Med. Paris*, 1913. Séance du 18 Nov. Vol. 70. (3e sér.). 77e Année. No. 36, pp. 442–444.

—— (M.) & PAURON (M.). Contribution à l'Etude de l'Action de l'Emétine dans le Traitement des Abcès dysentérique du Foie.—*Bulls. et Mems. Soc. Méd. des Hôpit. de Paris*, 1913. Dec. 4. (33e sér.) Vol. 29. No. 35, pp. 683–691.

DOUGLAS (S. R.). Notes on Amoebic Dysentery from Papers published during the past year.—*Brit. Med. Jl.*, 1913. Nov. 15. pp. 1282–1283.

GAUDUCHEAU (A.). Sur l'Etat parasitaire et le Rôle pathogène d'une petite Amibe.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 560–564.

GREER (Alvis E.). Amoebic Dysentery treated with Emetine.—*Texas State Jl. of Med.*, 1913. Dec. Vol. 9. No. 8, p. 254.

HEYMANN (P.). De l'Examen radiologique du Foie. Sa Valeur dans les Cas d'Abcès.—*Bull. Soc. Méd. Chirurg. Indochine*, 1913. Oct. Vol. 4. No. 8, pp. 364–374. With 2 plates.

JAMES (W. M.). Report of a Case of Infection with *Entamoeba tetragena*.—*Proc. Canal Zone Med. Assoc.* for the half year April to Sept., 1912. Vol. 5. Pt. 1. pp. 46–52.

KUENEN (W. A.) & SWELLENGREBEL (N. H.). Die Entamöben des Menschen und ihre praktische Bedeutung.—*Centralbl. f. Bakt.* 1. Abt. Orig. 1913. Nov. 15. Vol. 71. Nos. 5–7, pp. 378–410. With 2 plates & 15 text figs.

LEGRAND (Hermann). Abcès amibien du Cerveau opéré chez un Malade ayant présenté plusiers Rechutes de Dysenterie et Deux Abcès du Foie, successivement opérés et guéris. Mort, Autopsie, Histologie et Cultures bacteriologiques. (Rapport de M. Jacob.)—*Bulls. et Méms. Soc. de Chirurgie de Paris*, 1913. Nov. 18. Vol. 39. No. 34, pp. 1435–1442.

LESK (Robert). Ueber seltenere Komplikationen der Amoebendysenterie. (Peritonitis e perforatione ulceris dysenterici coeci, Abscessus perityphliticus dysentericus, Parotitis, Strictura recti, Incarceratio interna) —*Geneesk. Tijdschr. v. Nederl.-Indie*, 1913. Vol. 53. No. 5 pp. 639–655. With 1 plate and 1 chart.

LYONS (Randolph). Emetine Hydrochlorid in the Treatment of Amebic Dysentery.—*New Orleans Med. & Surg. Jl.*, 1913. Oct. Vol. 66. No. 4, pp. 278–282.

MATHIS (C.). Entamibes des Singes.—*Bull. Soc. Med. Chirurg. de l'Indochine*, 1913. Oct. Vol. 4. No. 8, pp. 388–410. With 4 plates.

MEDICAL MISSIONS IN INDIA, 1913. Oct. Vol. 19. No. 75, pp. 169–170. Note on the Value of Emetine in the Treatment of Amoebic Dysentery. [E. F. N.].

MORYIASU. On the Liver Abscess as a Complication by Amoebic Dysentery.—*Sei-I-Kwai Med. Jl.*, 1913. Oct. 10. Vol. 32. No. 10. [Whole No. 380.] p. 121. (The Original in No. 17. Vol. 27, 1913, of the *Jl. Tokyo Med. Assoc.* With 9 pictures).

ORTICONI (A.). La Dysenterie amibienne et le Chlorhydrate d'Emétine.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 609–612

PELISSIER. Grand Abcès Double du Foie. Hépatomie.—Guérison. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Med. Colon.*, 1913. July-Aug.-Sept. Vol. 16. No. 3. pp. 777–779.

PHILLIPS (Llewellyn). Amoebiasis. (1) Cerebral Abscess secondary to Amoebic Abscess of the Liver; (2) The Treatment of Liver Abscess discharging through the Lung.—*St. Bart.'s Hosp. Jl.*, 1913. July. Vol. 20. No. 10, pp. 158–159.

——. Le Traitement spécifique de la Dysenterie bacillaire avec une Notice sur l'Emploi du Chlorhydrate d'Emétine dans la Dysenterie amibienne.—*Rev. Med. d'Egypte*, 1913. Oct. No. 10 [6 pp.].

SITSEN (A. E.). Merkwaardige Complicaties bij Amoeben-dysenterie.—*Geneesk. Tijdschr. v. Ned.-Indie*, 1913. Vol. 53. No. 5, pp. 700–716. With 1 text fig.

SPITTEL (R. L.). The Effects of Emetine on Abscess of the Liver.—*Brit. Med. Jl.*, 1913. Oct. 25, p. 1058.

TUFFIER. Abcès du Foie traité par l'Emétine. [A propos du procès verbal.]—*Bulls. et Mems. Soc. Chirurgie de Paris*, 1913. Nov. 25. Vol. 39. No. 35, pp. 1454–1455.

WALKER (Ernest Linwood) & SELLARDS (Andrew Watson). Experimental Entamoebic Dysentery.—*Philippine Jl. of Science*, Sec. B., Trop. Med., 1913. Aug. Vol. 8. No. 4, pp. 253–331. With 1 plate.

WENYON (C. M.). The Morphology of the Intestinal Amoebae of Man.—*Brit. Med. Jl.*, 1913. Nov. 15, pp. 1287–1288.

WHERRY (Wm. B.). Studies on the Biology of an Amœba of the Limax Group. *Vahlkampfia* sp. No. 1.—*Arch. f. Protistenkunde*. 1913. Sept. 25. Vol. 31. No. 1, pp. 77–94. With 2 plates and 8 text figs.

WILLIAMS (Anna W.). & CALKINS (Gary N.). Cultural Amebae. A Study in Variation.—*Jl. of Med. Research*, 1913. Oct. Vol. 29. (New Ser. Vol. 24). No. 1. (Whole No. 140), pp. 43–56. With 4 tables and 4 plates.

WINN (Claud M.). The Therapeutic Effect of Salvarsan in the Treatment of Amoebic Dysentery and Amoebiasis: Report of Twelve Cases: A Preliminary Note.—*Proc. Canal Zone Med. Assoc.* for half year April to Sept., 1912. Vol. 5. Pt. 1, pp. 7-10.

BERI-BERI.

CASEY (James P.). The Etiology of Beri-Beri. [Memoranda.] *Brit. Med. Jl.*, 1913. Oct. 25, p. 1091.

FRASER (H.) & STANTON (A. T.). The Etiology of Beri-Beri. [Memoranda.]—*Brit. Med. Jl.*, 1913. Oct. 25, p. 1091.

STANLEY (Arthur). The Etiology of Beri-Beri. [Memoranda.]—*Brit. Med. Jl.*, 1913. Nov. 1, p. 1160.

TAZAWA (N.). On the Nutritive Defect caused by Rice Flour. [In Japanese.]—*Sei-I-Kwai Med. Jl.*, 1913. May 10. Vol. 32. No. 5. (Whole No. 375).

VEDDER (Edward B.) & WILLIAMS (Robert R.). Concerning the Beri-Beri-Preventing Substances or Vitamines contained in Rice Polishings. A Sixth Contribution to the Etiology of Beri-Beri.—*Philippine Jl. of Science*, Sect. B., Trop. Med., 1913. June. Vol. 8. No. 3, pp. 175–195.

VOEGTLIN (Carl) & TOWLES (Caroline). The Treatment of Experimental Beri-Beri with Extracts of Spinal Cord.—*Jl. of Pharmacology & Experim. Therapeutics*, 1913. Sept. Vol. 5. No. 1, pp. 67–76.

WELLMAN (Creighton), EUSTIS (Allan C.) & SCOTT (Leonard C.). The Rapid Cure of Polyneuritis Gallinarum by Intramuscular Injection of a Substance isolated from Rice.—Note on the Pathology of the Disease. A Preliminary Report.—*Amer. Jl. Trop. Dis. & Preventive Med.*, 1913. Oct. Vol. 1. No. 4, pp. 295–299.

YABE (T.). Infantile Beri-Beri. [In Japanese.]—*Sei-I-Kwai Med. Jl.* 1913. May 10. Vol. 32. No. 5. (Whole No. 375.)

YAMAGIWA (R.), KOYANO (T.), MIDORIKAWA (H.) & MOGI (T.). Experimental Study on the Cause and Nature of Beri-Beri. Report I.—*Sei-I-Kwai Med. Jl.*, 1913. Feb. 10. Vol. 32. No. 2. (Whole No. 372), pp. 12–15. (The Original in No. 23. Vol. 26, 1912 of the *Jl. Tokyo Med. Assoc.*).

BLACKWATER FEVER.

BARRATT (J. O. Wakelin). Recent Experimental Research bearing upon Blackwater Fever.—*Ann. Trop. Med. & Parasitology*, 1913. Nov. 7. Ser. T. M. Vol. 7. No. 3 B., pp. 367–369.

Barreto (Manuel Gomes). Febre Biliosa Hemoglobinurica. Contribuicao para o Estudo da sua Etiologia.—*Arquivos do Higiene e Patologia Exoticas.* 1913. Oct. 31. Vol. 4, pp. 107–117. With 3 plates.

Griewank (E.). Quelques Considerations étiologiques et thérapeutiques sur la Fièvre bilieuse hémoglobinurique.—*Gaz. hebd. des Sci. Med. de Bordeaux,* 1913. Sept. 7. Vol. 34. No. 36, pp. 421–423.

Nakagawa (K.). On the Blackwater Fever and its Clinical Study in Korenko, Formosa.—*Sei-I-Kwai Med. Jl.,* 1913. Feb. 10. Vol. 32. No. 2. (Whole No. 372)., p. 12. (The Original in No. 16, Vol. 26, 1912, of the *Jl. Tokyo Med. Assoc.*)

Napier (A. H.). Is Syphilis a Factor in Blackwater Fever?—*Indian Med. Gaz.,* 1913. Oct. Vol. 48. No. 10, pp. 389–390.

Stephens (J. W. W.). Studies in Blackwater Fever.—*Ann. Trop. Med. and Parasit.,* 1913. Dec. Vol. 7. No. 4, pp. 479–507. With 2 charts.

Woldert (Albert). Blackwater Fever: Its Causes and Treatment.—*Texas State Jl. of Med.,* 1913. Dec. Vol. 9. No. 8, pp. 247–251.

CHOLERA.

Bindi Nello. Ricerche circa l'Affermata Modificabilità del Vibrone colerigeno in Ambiente Idrico.—*Ann. d'Igiene Sperimentale,* 1913. Vol. 23. (New Ser.) No. 3, pp. 243–251. With 1 fig.

Cano (U.). Ueber die Wanderung des Cholera-vibrios im Körper des befallenen Tieres.—*Centralbl. f. Bakt.* 1. Abt. Orig., 1913. Dec. 16. Vol. 72. No. 3, pp. 124–126.

Defressine (C.) & Cazeneuve (H.). Sur la Persistance du Vibrion cholérique dans l'Organisme humain et dans quelques Milieux extérieurs.—*Arch. de Med. et Pharm. Navales,* 1913. Nov. Vol. 100. No. 11, pp. 366–376.

della Vida (Mario Levi). Portatori ed Emuntori di Germi patogeni. Alcune osservazioni serologiche sui portatori del Vibrione Colerigeno.—*In Onore del Professore Angelo Celli nel 25° Anno di Insegnamento.* pp. 373–400.

Dieudonne (A.) & Baerthlein (K.). Ueber Choleraelektivnährböden.—*Jl. of State Med.,* 1913. Nov. Vol. 21. No. 11, pp. 672–678.

Emmerich (Rudolf). Zur Aetiologie der Cholera asiatica.—*Jl. of State Med.,* 1913. Oct. Vol. 21. No. 10, pp. 604–609. With Discussion, pp. 609–611.

Gallas. Le Choléra dans l'Inde française. [Clinique d'Outre-Mer.] *Ann. d'Hyg. et Med. Colon.,* 1913. July-Aug.-Sept. Vol. 16. No. 3, pp. 767–776.

Goérē (J.) Le Choléra à Ferryville (Tunisie) en 1911. Etude clinique et bactériologique.—*Arch. de Med. et Pharm. Navales,* 1913. Oct. Vol. 100. No. 10, pp. 266–278.

Hofer (Gustav) & Hovorka (Jaroslav). Versuche zur elektiven Ausgestaltung des Dieudonnéschen Choleranährbodens.—*Centralbl. f. Bakt.* 1 Abt. Orig., 1913. Sept. 27. Vol. 71. No. 1, pp. 103–112.

v. Konschegg (A.) & Weltmann (O). Ueber einen Fall von choleraähnlicher Erkrankung, hevorgerufen durch einen pathogenen Vibrio.—*Das Oesterreichische Sanitätswesen,* 1913. Oct. 16. Vol. 25. No. 42, pp. 1401–1406.

Logan (O. T.). The "Wholesale" Treatment of Cholera.—*China Med. Jl.,* 1913. Sept. Vol. 27. No. 5, pp. 302–314. With 5 figs.

Michailow (Sergius). Pathologisch-anatomische Untersuchungen der feineren Struktur der Gehirnrinde, der Rinde des Kleinhirns, des Verlängerten und des Ruckenmarks des Menschen bei asiatischer Cholera.—*Arch. f. Pyschiatrie u. Nervenkrankht,* 1913. Vol. 51. No. 2, pp. 587–687. With 8 plates.

NEWTON (H. Martyn). Cholera.—*Medical Missions in India.* 1913. Oct. Vol. 19. No. 75, pp. 143–147.

ORTICONI & SARTORY (A.). Le Choléra.—*Gaz. des Hopit. Civils et Militaires*, 1913. Oct. 11. Vol. 86. No. 116, pp. 1805–1813, and Oct. 18. No. 119, pp. 1853–1859.

—— & ——. Il Colera.—*Riforma Medica.*, 1913. Nov. 5. Vol. 29. No. 46, pp. 1280–1281.

PUNTONI (Vittorio) Azione della Tossina colerica sull'Intestino degli Animali sotto l'Influenza del Caldo umido.—*Gazz. d. Ospedali e d. Cliniche*, 1913. Nov. 23. Vol. 34. No. 140, pp. 1466–1469.

ROTKY (Karl). Immunisierungsversuche gegen El Tor.—*Prager Med. Wochenschr.*, 1913. Vol. 38. No. 28.

SABELLA (P.). Fisiologia e Patologia della Pelle nella Tossi infezione colerica.—*Gior. Ital. d. Malat. Veneree e d. Pelle*, 1913. Oct. 30. Vol. 54. (Anno 48). No. 5, pp. 526–551.

STIVEN (H. E. S.). Enteritis in a Turkish Cholera Camp.—*Practitioner*, 1913. Dec. Vol. 91. No. 6. (No. 546). pp. 860–874. With 2 plates.

[The mission to which the anthor was attached was divided into two parts, one surgical, the other for cholera cases, with a bacteriologist and laboratory equipment. Accommodation for 1,100 patients was available. Only a few chronic cases of cholera (10 per cent.) were seen, the rest being dysenteries or enteritis and cases of chronic enteritis believed to be due to *B. coli*. Nothing new of a medical character appears in the report.]

WELCKER (A.). Cholera- und Typhusgangrän. Die symmetrische Gangrän im Balkankriege kein Frostschaden.—*Zentralb. f. Chirurgie*, 1913. Oct. 18. Vol. 40. No. 42, pp. 1625–1628.

——. Nachtrag zur "Cholera und Typhusgangrän. Die symmetrische Gangrän im Balkankriege kein Frostschaden."—*Zentralbl. f. Chirurgie.* 1913. Nov 15. Vol. 40. No. 46, pp. 1769–1773. With 6 figs.

ZIROLIA (G.). Ueber einen aus Brunnenwasser gezüchteten Choleravibrio, Ursache einer Choleraepidemie.—*Hygienische Rundschau*, 1913. Sept. 15. Vol. 23. No. 18, pp. 1081–1085.

DENGUE.

DALSUKHRAM (Ganpatram). Dengue in Guzrat. [Correspondence.] *Indian Med. Gaz.*, 1913. Nov. Vol 48. No. 11, pp. 451–452.

DYSENTERY (Bacillary and Unclassed).

(A.) Bacillary.

BATES (L. B.). Ants as Possible Transmitting Agents in Typhoid Fever and Bacillary Dysentery.—*Proc. Canal Zone Med. Assoc.* for the half Year, April to Sept. 1912. Vol. 5. Pt. 1, pp. 33–36.

BAUER (J.) ELLENBECK & FROMME. Ueber Y-Ruhr bei Säuglingen und kleinen Kindern.—*Arch. f. Kinderheilkunde.* (Festschrift A. Baginsky), 1913. Vol. 60–61, pp. 35–84. With 17 curves.

BRAU. Epidémie de Dysenterie Bacillaire observée à Saïgon en 1912.—*Ann. d'Hyg. et Med. Colon*, 1913. July-Aug.-Sept. Vol. 16. No. 3, pp. 710–738.

BUSCH. Ueber serumfeste Ruhrstämme.—*Centralbl. f. Bakt.* 1. Abt. Orig., 1913. Nov. 15. Vol. 71. No. 5–7, pp. 515–520.

CANAVAN (M. M.). Third Note on the Persistence of Agglutinins for *Bacillus dysenteriae* in the Danvers Hospital Cases.—*Boston Med. and Surg. Jl.*, 1913. Oct. 30. Vol. 149. No. 18, pp. 643–645.

DRESEL (E. G.) & MARCHAND (Fritz). Bakteriologische und klinische Beobachtungen bei Ruhrinfektionen.—*Zeitschr. f. Hyg. u. Infektionskr*, 1913. Dec. 12. Vol. 76. No. 2, pp. 321–349.

FRIEDMANN. Die Ruhrepidemie beim Ulanenregiment Nr. 1 in der Kaiser Franz Josefs Kaserne in Lemberg.—*Der Militarärzt*, 1913. July 26. Vol. 47. No. 14, pp. 185–190, and Aug. 9. No. 15, pp. 195–198. Ausgegeben mit Nr. 31 und Nr. 33. *Wien. Med. Woch.*

GETTINGS (H. S.). Dysentery, Past and Present.—*Jl. of Mental Science*, 1913. Oct. Vol. 59. No. 247, pp. 605–621.

HARPER (W. W.). Bacillary Dysentery in Infants.—*Southern Med. Jl.*, 1913. Oct. Vol. 6. No. 10, pp. 637–639.

[Deals with the summer diarrhoea of infants. As a scientific contribution it is valueless.]

NAPONEK (Desider). Zur Kenntnis der Dysenteriebacillen.—*Centralbl. f. Bakt.* 1. Abt. Orig., 1913. Nov. 15. Vol. 71. No. 5–7, pp. 337–338.

PHILLIPS (L.). Le Traitement spécifique de la Dysenterie bacillaire, avec une Notice sur l'Emploi du Chlorhydrate d'Emétine dans la Dysenterie amibienne.—*Rev. Med. d'Egypte*, 1913. Oct. No. 10, 6 pp.

REID (D. McKinley). On the Bacteriology of Asylum Dysentery in England.—*Jl. of Mental Science*, 1913. Oct. Vol. 59. No. 247, pp. 621-640

ROGERS (Leonard). The Rational Treatment of Chronic Bacillary Dysentery; and the Advantages of Enemata of Silver Gelatose.—*Brit. Med. Jl.*, 1913. Nov. 8, pp. 1198–1200.

SIEGEL (Erich). Ueber Y-Ruhr bei Säuglingen.—*Arch. f. Kinderheilkunde.* (Festschrift A. BAGINSKY), 1913. Vol. 60–61, pp. 689–698.

WILLMORE (J. Graham) & SAVAGE (A. Harold). The Diagnosis and Treatment of Epidemic Bacillary Dysentery.—*Brit. Med. Jl.*, 1913. Nov. 15, pp. 1283–1287.

(B.) Unclassed.

ALSTON (Henry). Ipecacuanha sine Emetina. [Memoranda.] *Brit. Med. Jl.*, 1913. Nov. 22, p. 1380.

[The author deplores the belittling of ipecacuanha sine emetina, as he believes it has a very beneficial result in some cases of chronic colitis.]

BEHRENROTH (Erich). Das *Balantidium coli* und seine pathogene Bedeutung.—*Arch. f. Verdauungs-Krankheiten*, 1913. Oct. 15. Vol. 19, pp. 42–62. With 2 text figs.

BRAU. Dysenterie balantidienne en Cochinchine.—*Bull. Soc. Med. Chirurg. Indochine*, 1913. Oct. Vol. 4. No. 8, pp. 384–387.

FIELD (F. E.). Observations on Dysentery, with Special Reference to its Treatment by Hypodermic Injections of Emetine.—*British Guiana Medical Annual for* 1912, pp. 1–7. With 2 charts.

HARTSOCK (Frederick M.). Emetine in Dysentery.—*Military Surgeon*, 1913. Dec. Vol. 23. No. 6, pp. 517–521.

HUET. Cas de Dysenterie observés en Juin, 1912, à l'Hopital de Saïgon —*Ann. d'Hyg. et Med. Colon*, 1913. July-Aug.-Sept. Vol. 16. No. 3, pp. 738–741.

LESSING (Frank M.). Note on Ozone in the Treatment of Dysentery.—*Lancet.* Nov. 1, p. 1255.

MATHIEU & GIRAULT. Coliti gravi emorragiche o dissenteriformi (Lezioni cliniche).—*Gazz. d. Ospedali e d. Cliniche*, 1913. Sept. 14. Vol. 34. No. 110, pp. 1149–1151.

[Reprint of paper noticed in this *Bulletin*, Vol. I, p. 723.]

NEUBERT. Ueber die Wirkung von Uzara und geronnener Milch bei Darmerkrankungen.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1913. Dec. Vol. 17. No. 23, pp. 840–842.

RODENWALDT (E.). Dysenterie in Togo.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1913. Dec. Vol. 17. No. 23, p. 842.

Rodgers (R. T.). Dysentery in the Raipur Central Jail, C.P.—*Indian Med. Gaz.*, 1913. Nov. Vol. 48. No. 11, pp. 424–428. With 2 charts.

Rogers (Leonard). Dysenteries. Their Differentiation and Treatment.—336 pp. With 10 plates, 2 charts and 3 diagrams. 1913. London: Henry Frowde & Hodder and Stoughton. [Price 10/6 net.]

Stiles (C. W.) & Keister (Wm. S.). Flies as Carriers of Lamblia Spores. The Contamination of Food with Human Excreta.—*U.S. Public Health Rep.*, 1913. Nov. 28. Vol. 28. No. 48, pp. 2530–2534.

FILARIASIS.

Branch (Edmund R.). Salvarsan in Filariasis.—*Jl. Trop. Med. and Hyg.*, 1913. Dec. 1. Vol. 16. No. 23, pp. 364–365. With 1 text fig.

Breinl (Anton). Investigation into the Morphology and Life History of *Onchocerca Gibsoni*.—*Australian Inst. of Trop. Med.* Report for the year 1911, pp. 5–17.

Fülleborn. Die Filarien des Menschen.—*Handbuch der pathogenen Mikroorganismen.* (von Kolle (W.) & von Wassermann (A.),) 1913. Vol. 8, pp. 185–344. With 41 text figs.

Low (George C.). Discussion on Filariasis. Opening Paper.—*Brit. Med. Jl.*, 1913. Nov. 15, pp. 1298–1301.

Marotte & Morvan. Filariose et Natalité.—*Arch. de Parasitologie*, 1913. July 10. Vol. 16. No. 2, pp. 306–313.

—— & ——. L'Eosinophilie dans la Filariose.—*Compt. Rend. Soc. Biol.*, 1913. Oct. 24. Vol. 75. No. 29, pp. 241–243.

Pricolo (Antonio). Sur la Filaire hématique du Chameau.—*Centralbl. Bakt.* 1. Abt., Orig., 1913. Oct. Vol. 71. No. 2–3, pp. 199–200.

Rathery. Chiluria. Lezioni cliniche.—*Gazz. d. Ospedali e Cliniche*, 1913. Nov. 2. Vol. 34. No. 131, pp. 1372–1375.

Rogers (W.). A Note on a Case of *Loa Loa*.—*Ann. Trop. Med. and Parasit.*, 1913. Nov. 7. Vol. 7. No. 3B, pp. 363–365.

Rauenbusch. Beitrag zur Filariasis des Auges.—*München. Med. Wochenschr.*, 1913. Dec. 30. Vol. 60. No. 52, p. 2910.

Rodenwaldt (E.). Eine neue Mikrofilarie des Menschen.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1913. Vol. 17. No. 23, p. 843.

Schulze (Nadine). Ein Fall von menschlicher Filaria Infektion.—*Centralbl. f. Bakt.*, 1913: Nov. 15. 1 Abt., Orig. Vol. 71. No. 5–7, pp. 410–413. With 1 text fig.

Stefko (W.). La Filariose des Oiseaux de la Russie Centrale.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 592–594.

Elephantiasis.

Fülleborn & Simon. Untersuchungen über das Vorkommen der Larven von *Onchocerca volvulus* in Lymphdrüsen und in der Zirkulation. (Vorläufige Mitteilung).—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1913. Dec. Vol. 17. No. 23, pp. 843–844.

—— & ——. Untersuchungen über das Vorkommen der Larven von *Onchocerca volvulus* in Lymphdrüsen und in der Zirkulation. *Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.*, 1913. Nov. Vol. 17. Beiheft 9. pp. 5–18 (501–514). With 2 plates.

Noc (F.) & Stevenel (L.). Filariose, Lymphangite et Eléphantiasis à la Martinique.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 663–668.

Dracontiasis.

Smith (J. B.). The Prevention of Guinea-Worm Infection. [Correspondence.]—*Brit. Med. Jl.*, 1913. Dec. 20, p. 1610.

HELMINTHIASIS.

Trematodes.

Yokogawa (S.). Ueber einen neuen Parasiten *Metagonimus Yokogawai*, der die Forellenart *Plecoglossus altivelis* (Temminck) zum Zwischenwirt hat. Bildung einer neuen Gattung.—*Centralbl. f. Bakt.*, 1. Abt., Orig., 1913. Dec. 16. Vol. 72. No. 3, pp. 158–179. With 3 plates.

Distomiasis.

Sambuc (E.) & Baujean (R.). Distomatose hépatique et pancréatique.—*Bull. Soc. Méd.-Chirurg. Indochine*, 1913. Oct. Vol. 4. No. 8, p. 413.

—— & ——. Un Cas de Cachexie aqueuse chez l'Homme (Distomatose hépato-pancréatique, avec Syndrome pseudo-béri-bérique). *Bull. Soc. Méd.-Chirurg. Indochine*, 1913. Nov. Vol. 4. No. 9, pp. 425–429.

Schistosomiasis.

Edgar (W. Harold). Yangtsze Fever.—*Jl. State Med.*, 1913. Sept. Vol. 21. No. 9, pp. 542–553.

Harrison (W. S.). The Prognosis in Bilharziasis.—*Jl. R. Army Med. Corps*, 1913. Oct. Vol. 21. No. 4, pp. 385–388.

Katsurada (F.). Schistosomiasis japonica.—*Centralbl. f. Bakt.*, 1. Abt., Orig., 1913. Dec. 31. Vol. 72. Nos. 4–5, pp. 363–379. With 2 plates and 2 figs.

Cestodes.

Taeniasis (Intestinal).

Kajava (Yrjö). Några iakttagelser rörande den breda bandmaskens (*Bothriocephalus latus*) blasmask.—*Finska Läkaresällskapets Handlingar*, 1913. June. Vol. 55, pp. 700–707.

Railliet (G.). Un Cas de Bothriocéphalose observé en France.—*Bulls. et Mém. Soc. Méd. des Hôpit. de Paris*, 1913. Dec. 4. 33e Sér. Vol. 29. No. 35, pp. 717–720.

McCulloch (Hugh). Notes on Cestode Monstrosities. With a Report of a New Case of *Taenia saginata* with Y-shaped Proglottides.—*Amer. Jl. Trop. Dis. and Preventive Med.*, 1913. Dec. Vol. 1. No. 6, pp. 453–461. With 2 figs.

Nematodes.

Ankylostomiasis.

Bryson (A. Carruthers). Ankylostomiasis.—*China Med. Jl.*, 1913. Nov. Vol. 27. No. 6, pp. 363–369.

Cavallone (Giovanni). L'Anchilostomiasi in Desana.—*Gazz. d. Ospedali e d. Cliniche*, 1913. Dec. 11. Vol. 34. No. 148, pp. 1551–1552.

Conran (P. C.). Ankylostomiasis in the North Nyasa District of Nyasaland.—*Jl. London School Trop. Med.*, 1913. Nov. Vol. 2. Part 3, pp. 225–230.

da Costa (Bernardo Bruto). Breves palavras sobre a Anquilostomíase em S. Tomé.—*Arquivos de Higiene e Patologia Exóticas*, 1913. Oct. 31, Vol. 4. pp. 119–180.

Greisert. Die Behandlung der Anchylostomiasis mit Naphthol, Thymol, Eukalyptusöl und Extr. filicis mar.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1913. Nov. Vol. 17. No. 22, pp. 765–782.

Keith (R. D.). The treatment of Ankylostomiasis.—*Lancet*, 1913. Oct. 18, pp. 1117–1118.

Lane (Clayton). Ankylostomes and Ankylostomiasis in Bengal.—*Indian Med. Gaz.*, 1913. Nov. Vol. 48. No. 11, pp. 417–423. With 4 plates.

LEIPER (Robert T.). The Apparent Identity of *Agchylostoma Ceylanicum* (Looss, 1911), and *Agchylostoma Brasiliense* (Faria, 1910).—*Jl. Trop. Med. and Hyg.*, 1913. Nov. 1. Vol. 16. No. 21, pp. 334–335.

MOORE (Alfred). Remarkable Emaciation in a Case of Hookworm Disease.—*Amer. Jl. Trop. Dis. and Preventive Med.*, 1913. Oct. Vol. 1. No. 4, pp. 294–295. With 2 figs.

OSTROM (Hjalmar). Ankylostomiasis in Ikoko.—Reprint from *The Congo News Letter*, 1913.

Trichocephaliasis.

de MONTGOLFIER (Casati). Psychopathie à forme paranoïde et Auto-intoxication intestinale où les Trichocéphales jouèrent un Rôle inattendu. Guérison.—*Gaz. hebd. des Sci. Méd. de Bordeaux*, 1913. Aug. 10. Vol. 34. No. 32, pp. 375–377.

Trichinelliasis.

BALLAGI (John). An Epidemic of Trichinosis in Pennsylvania.—*New York Med. Jl.*, 1913. Dec. 13. Vol. 98. No. 24. [Whole No. 1828], pp. 1166–1167.

Ascariasis.

BORINI (Agostino). Pseudo-Appendicite da Ascaridi.—*Gazz. d. Ospedali e d. Cliniche*, 1913. Nov. 18. Vol. 34. No. 138, pp. 1447–1448.

PLEW (Hermann). Ueber die Perforation des Darmes durch Askariden.—*Arch. f. Kinderheilkunde*, 1913. Nov. 15. Vol. 62. No. 1–2, pp. 11–33.

POUMEYRAC. Lombricose à Forme Grave.—*Ann. d'Hyg. et Méd. Colon*, 1913. July-Aug.-Sept. Vol. 16. No. 3, pp. 783–784.

PRZEDBORSKI (J.). Ueber einen interessanten Fall von Ascaridiasis und Meningitis Tuberculosa und über Wirkung des Oleum chenopodii auf Ascariden.—*Berlin. klin. Wochenschr.*, 1913. Oct. 27. Vol. 50. No. 43, p. 1987.

ROW (T. G. S.). Round Worms and Pregnancy.—*Indian Med. Gaz.*, 1913. Oct. Vol. 48. No. 10, pp. 395–396.

SWELLENGREBEL (N. H.). Ontwikkeling van Ascaris-embryonen buiten het menschelijk lichaam.—*Geneesk. Tijdschr. v. Ned.-Indie.*, 1913. Vol. 53. No. 5., pp. 672–674. With 1 plate.

TIRUMURTI (T. S.). The Vagrant Habits of *Ascaris lumbricoides*, with the Report of a Case of Interest.—*Jl. Trop. Med. and Hyg.*, 1913. Dec. 15. Vol. 16. No. 24, pp. 379–380.

VICKERY (D. Hadden). Intestinal Obstruction due to a Coil of Worms.—*Brit. Med. Jl.*, 1913. Dec. 13, p. 1534.

Oxyuriasis.

RHEINDORF (A.). Ueber die durch die Oxyuris vermicularis hervorgerufenen pathologisch-anatomischen Veränderungen in der Wand des Wurmfortsatzes nebst Betrachtungen über die Genese und das Vorkommen der Appendicitis.—*Frankfurter Zeitschr. f. Pathologie*, 1913. Vol. 14. No. 2, pp. 212–266. With 24 text figs.

Serum and Tissue Reactions, Toxins, etc.

ALESSANDRINI (Guilio). Sul Potere Battericida dei Vermi intestinali.—*In Onore del Professore Angelo Celli nel 25° Anno di Insegnamento*, pp. 259–276.

MANCEAUX (L.). Sur les Polynucléaires Eosinophiles Hématophages.—*Compt. Rend. Soc. Biol.*, 1913. Oct. 24. Vol. 75. No. 29, pp. 240–241.

RACHMANOW (A.). Lésions nerveuses dans l'Anaphylaxie Vermineuse et Sérique.—*Compt. Rend. Soc. Biol.*, 1913. Oct. 31. Vol. 75. No. 30, pp. 317–319.

General and Unclassed.

Crowell (B. C.) & Hammack (R. W.). Intestinal Parasites encountered in Five Hundred Autopsies, with Reports of Cases.—*Philippine Jl. Science*, 1913. June. Vol. 8. Sec. B. No. 3, pp. 157–174.

Frazer (T. Atchison). Intestinal Parasites.—*Kentucky Med. Jl.*, 1913. Nov. 1. Vol. 11. No. 22, pp. 958–960.

Johnston (T. H.). Notes on some Entozoa.—*Proc. Roy. Soc. Queensland*, 1913. Vol. 24, pp. 63–91. With 5 plates.

Kay (J. A.). A New Ovum and its Miracidium.—*Practitioner*, 1913. Oct. Vol. 91. No. 4. (No. 544), pp. 580–582. With 1 plate.

Leiper (R. T.). Seven Helminthological Notes.—*Jl. London School Trop. Med.*, 1913. Nov. Vol. 2. Part 3, pp. 175–178. With 1 fig.

——. A Comment on Two Recent Articles on Helminth Infections in Man.—(Memoranda).—*Brit. Med. Jl.*, 1913. Nov. 15, p. 1302.

Leon (N.). Notes de Parasitologie.—*Centralbl. f. Bakt.* 1. Abt. Orig., 1913. Dec. 31. Vol. 72. No. 4–5, pp. 380–385. With 6 figs.

Lima (Armando R. V.). Meio rapido para revelar ovulos de parasitas intestinaes nas fezes.—*Brazil Medico*, 1913. Oct. 22. Vol. 27. No. 40, p. 427.

McNeil (H. L.). An Improved Method of Extracting Ova from Stools.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 1. Vol. 61. No. 18, pp. 1628–1629.

Richter (Paul). Historische Beiträge zur Urologie.—*Zeitschr. f. Urologie*, 1913. Sept. Vol. 7. No. 9, pp. 735–738. With 2 text figs.

Smith (Allen J.) & Denney (Oswald E.). *Agamomermis restiformis* (Leidy), Stiles, (?) from the Human Urethra.—*Amer. Jl. Trop. Dis. and Preventive Med.*, 1913. Oct. Vol. 1. No. 4, pp. 281–287. With 1 plate.

Anthelmintics.

Limnell (Axel R.). Semen Cucurbitae maximae, ett beaktansvärdt anthelminthicum.—*Finska Läkaresällskapets Handlingar*, 1913. Aug. Vol. 56, pp. 232–241.

Przedborski (J.). Ueber einen interessanten Fall von Ascaridiasis und Meningitis Tuberculosa und über Wirkung des Oleum chenopodii auf Ascariden.—*Berlin. klin. Wochenschr.*, 1913. Oct. 27. Vol. 50. No. 43, p. 1987.

Yoshida. On the Haemolysis by Thymol.—*Sei-I-Kwai Med. Jl.*, 1913. Oct. 10. Vol. 32. No. 10. [Whole No. 380], pp. 125–126. (The Original in No. 3, Vol. 1. of the Japanese Med. Soc.)

KALA AZAR (and Tropical Sore.)

Bassett-Smith (P. W.). Kala-Azar in an Adult from Malta.—*Jl. R. Army Med. Corps*, 1913. Nov. Vol. 21. No. 5, pp. 581–584. With 1 text fig.

Cannata (S.). Sur Reperto del Parassita di Leishman nel Sangue periferico.—*Malaria e Malat. d. Paesi Caldi*, 1913. Aug.-Sept. Vol. 4. No. 5, pp. 303–306.

——. Le Piastrine del Sangue nella Leishmaniosi Infantile.—*Pediatria*, 1913. Sept. 30. Vol. 21. No. 9, pp. 645–648.

Caronia (G.). Sul Potere Complementare del Siero di Sangue nella Leishmaniosi Infantile.—*Malaria e Malat. d. Paesi Caldi*, 1913. Aug.-Sept. Vol. 4. No. 5, pp. 309–313.

——. Ueber die Heilbarkeit der Leishmania-Anämie.—*Zeitschr. f. Kinderheilk.* Orig., 1913. Sept. 13. Vol. 8. No. 6, pp. 452–460.

CORONIA (G.). Agglutinine e Precipitine Specifiche nella Leishmaniosi Infantile.—*Pediatria*, 1913. Sept. 30. Vol. 21. No. 9, pp. 641–644.

——. Spezifische Agglutinine und Präzipitine bei der infantilen Leishmaniosis.—*Zeitschr. f. Immunitätsforsch. u. Experiment. Therapie.* I. Teil. Orig., 1913. Nov. 24. Vol. 20. No. 1–2, pp. 174–177.

COCHRAN (S.). The Superficial Lymph-Nodes as a Source of Leishmania for the Diagnosis of Kala-Azar; with some Observations on Kala-Azar in China.—*Jl. London School Trop. Med.*, 1913. Nov. Vol. 2. Part 3, pp. 179–195. With 1 map and 1 fig.

DI CRISTINA (G.) & CARONIA (G.). Ricerche Serologiche nella Leishmaniosi infantile.—*Pediatria*, 1913. Nov. 30. Vol. 21. No. 11. pp. 801–817.

——. Serologische Untersuchungen bei der infantilen Leishmaniosis.—*Zeitschr. f. Kinderheilk.*, Orig., 1913. Nov. 15. Vol. 9. No. 2, pp. 128–146.

GRAY (A. C. H.). Report on some Observations made and Work done at the Pasteur Institute, Tunis.—*Jl. R. Army Med. Corps*, 1913. Dec. Vol. 21. No. 6, pp. 696–712. With 9 figs.

JEMMA (R.). L'Anémie par Leishmania.—*Arch. de Méd. des Enfants*, 1913. Oct. Vol. 16. No. 10, pp. 721–766.

LA CAVA (F.). Un Caso di Leishmaniosi interna (Kala-Azar) in una Giovinetta di 14 anni.—*Malaria e Malat. d. Paesi Caldi*, 1913. Aug.-Sept. Vol. 4. No. 5, pp. 317–320.

LAVERAN (A.). Kala-Azar Méditerranéen et Kala-Azar Indien.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 574–579.

——. Les Macaques et les Chiens sont Sensibles au Kala-Azar Indien comme au Kala-Azar Méditerranéen.—*Compt. Rend. Acad. Sci.*, 1913. Nov. 17. Vol 157. No. 20, pp. 898–901.

LEMAIRE (G.), SERGENT (E.), & LHERITIER (A.). Recherches sur la Leishmaniose du Chien d'Alger.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 579–581.

LO RE (Mariano) & DE STEFANO (Silvio). Sopra otto Casi di Anemia da Leishmania.—*Gaz. Internaz. d. Med. Chirurg. Igiene*, 1913. Dec. 6. No. 49, pp. 1157–1161.

SCORDO (F.). Alterazioni morfologiche dei corpi del Leishman nel Kala-Azar.—*Malaria e Malat. d. Paesi Caldi*, 1913. Aug.-Sept. Vol. 4. No. 5, pp. 313–317.

SIGNER (M.). Sulla Distribuzione della Leishmaniosi in Italia.—*Malaria e Malat. d. Paesi Caldi*, 1913. Aug.-Sept. Vol. 4. No. 5, pp. 320–323.

SMALLMAN (A. B.). Note on some Cellular Bodies found in a Case of Mediterranean Leishmaniasis.—*Jl. R. Army Med. Corps*, 1913. Dec. Vol. 21. No. 6, pp. 636–640. With 1 coloured plate.

SPAGNOLIO (Giuseppe). Sulla Ganglio-puntura nella Diagnosi di Leishmaniosi.—*Malaria e Malat. d. Paesi Caldi*, 1913. Aug.-Sept. Vol. 4. No. 5, pp. 306–308.

SPOLVERINI (L. M.). Contributo allo Studio della Leishmaniosi infantum.—*Pediatria*, 1913. Sept. 30. Vol. 21. No. 9, pp. 659–668.

STATHAM (J. C. B.) & BUTLER (G. G.). Note on Certain Bodies found by Liver puncture in a Case of Fever associated with Splenic enlargement.—*Jl. R. Army Med. Corps*, 1913. Dec. Vol. 21. No. 6, pp. 629–635. With 1 plate.

VISENTINI (A.). La Mie Ricerche di Trasmissione delle Leishmaniosi. [Lettere all'Editore.]—*Pathologica*, 1913. Dec. 1. Vol. 5. No. 122, p. 734.

Tropical Sore (Dermal Leishmaniasis).

MINETT (E. P.) & FIELD (F. E.). Notes on a Case of Dermal Leishmaniasis in British Guiana.—*British Guiana Medical Annual for* 1912, pp. 96–98, and reprinted in *Jl. Trop Med. and Hyg.*, 1913. Nov. 15. Vol. 16. No. 22, pp. 349–350.

NAPIER (A. H.). A Note on Frontier Sores. [Correspondence.]—*Indian Med. Gaz.*, 1913. Oct. Vol. 48. No. 10, p. 413.

PADESCA (Adelino). Nota sobre um Caso de Leishmaniase Cutaneo-Mucosa, proveniente do Brasil.—*Arquivos de Higiene e Patologia Exoticas*, 1913. Oct. 31. Vol. 4, pp. 51–62. With 5 plates.

STRONG (Richard P.), TYZZER (E. E.), BRUES (Charles T.), SELLARDS (A. W.), & GASTIABURU (J. C.). Verruga Peruviana, Oroya Fever and Uta.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 8. Vol. 61. No. 19, pp. 1713–1716.

VELEZ. Uta et Espundia.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, p. 545.

WAGON (P.). Un Cas de Leishmaniose cutanée traité avec Succès par l'Arsénobenzol (Billon).—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 624-625.

LEPROSY.

BAYON (H.). The Leprosy Problem in the British Empire.—*Lancet.* Nov. 29, pp. 1527–1530.

——. An Address on the Clinical and Bacteriological Aspects of Leprosy. Delivered at the Royal Society of Medicine.—*Brit. Med. Jl.*, 1913. Nov. 29, pp. 1420–1423.

CLEGG (Moses T.). Absence of Luetin Reaction on Lepers showing a Positive Wassermann Reaction.—*Treasury Dept. U.S. Public Health Bull.* No. 61, 1913. July, pp. 11–14.

HOLLMANN (Harry T.). The Presence of Acid-fast Bacilli in Secretions and Excretions of Lepers.—*Treasury Dept. U.S. Public Health Bull.* No. 61, 1913. July, pp. 15–22.

JANIN (Francisque). Essai de Sérothérapie de la Lèpre.—*Rev. de Med. et d'Hyg. Trop.*, 1913. Vol. 10. No. 2, pp. 81–89.

KIRBY-SMITH (J. L.). Tubercular Leprosy in a Negress.—*New York Med. Jl.*, 1913. Oct. 11. Vol. 98. No. 15, p. 708. With 1 illustration.

LEBOEUF (A.). Notes sur l'Epidémiologie de la Lèpre dans l'Archipel Calédonien.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 551–556.

—— ——. Sur la Présence de Bacilles de Hansen dans les Ganglions superficiels de Sujets sains en apparance.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 607–608.

LÖHE (H.). Beitrag zur Chirurgie der Nervenlepra.—*Zum 4. Oktober* 1913, *dem 60. Geburtstage Seiner Excellenz des Generalstabsarztes der Armee und Chefs des Sanitätskorps Prof. Dr. Otto v. Schjerning.* pp. 129–135.

McCOY (George W.). Fecundity of Hawaiian Lepers.—*Treasury Dept. U.S. Public Health Bull.* No. 61, 1913. July, pp. 23–25.

——. Observations on naturally acquired Rat Leprosy.—*Treasury Dept. U.S. Public Health Bull.* No. 61, 1913. July, pp. 27–30.

——. Glandular Tuberculosis among Lepers at the Molokai Settlement.—*Treasury Dept. U.S. Public Health Bull.* No. 61, 1913. July, pp. 3–6.

——. A Brief History of Leprosy in Hawaii.—*Military Surgeon*, 1913. Dec. Vol. 33. No. 6, pp. 522–527.

McCoy (George W.) & Goodhue (William J.). The Danger of Association with Lepers at the Molokai Settlement.—*Treasury Dept. U.S. Public Health Bull.* No. 61, 1913. July, pp. 7–10.

Paldrock (A.). Wanzen und Schaben als Verbreiter des Lepraerregers.—*Dermatol. Centralbl.*, 1913. Dec. Vol. 7. No. 3, pp. 66–71.

Priestly (Henry). Rat Leprosy in North Queensland.—*Australasian Med. Gaz.*, 1913. Nov. 1. Vol. 34. No. 18. [No. 459.] pp. 405–406.

Rudolph (Max). Beitrag zur Nastinbehandlung der Lepra.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. Oct. Vol. 17. No. 19, pp. 669–671. With 1 plate.

Santamaria (J. Martinez). Acquisition of Acid-fast Properties by a Filamentary Organism cultivated from an Animal injected with a Culture of Hansen's "Bacillus."—*Jl. Trop. Med. & Hyg.*, 1913. Oct. 1. Vol. 16. No. 19, p. 301.

Scott (L. Bodley). The Nastin Treatment of Leprosy.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 352–383.

Smith (Allen J.), Lynch (Kenneth M.), & Rivas (Damaso). The Transmissibility of the Lepra bacillus by the Bed-bug. (*Cimex lectularius* L.)—*Amer. Jl. of the Med. Sciences*, 1913. Nov. Vol. 146. No. 5, pp. 671–681.

Thomson (David). Preliminary Note on Bed-bugs and Leprosy.—*Brit. Med. Jl.*, 1913. Oct. 4, p. 849.

Unna Jun. (P.). Ueber Diathermiebehandlung bei Lepra.—*Berlin. klin. Wochenschr.* 1913. Nov. 17. Vol. 50. No. 46, pp. 2138–2140.

Vampre (Enjolras). Prophylaxia da Lepra.—*Rev. Med. de S. Paulo*, 1913. Feb. 28. Vol. 16. No. 4, pp. 76–78.

de Verteuil (F. L.). The Action of Radium on the Lepra Bacillus.—*Arch. of the Rontgen Ray*, 1913. July. Vol. 18. No. 2. (No. 156), p. 53.

White (Charles J.). What shall we do with our Lepers? [Editorial.] *Jl. Cutaneous Diseases*, 1913. Nov. Vol. 31. No. 11. [Whole No. 374.] pp. 799–801.

MALARIA.

Alcock (A.). Synopsis of the Anopheline Mosquitos of Africa and of the Oriental Region.—*Jl. London School of Trop. Med.*, 1913. Nov. Vol. 2. Part 3, pp. 153–166. With 1 plate.

de Almeida, Jun. (Theobald). Um Caso de Asthma palustre, observado numa Menina de Sete Annos.—*Arch. Brasileiros de Med.*, 1913. Sept. Vol. 3. No. 8, pp. 776–778.

Annales d'hygiene et de Médecine Coloniales, 1913. July-Aug.-Sept. Vol. 16. No. 3, pp. 781–783. [Clinique d'Outre-Mer.] Extrait du Rapport du Médecin Chef de l'Ambulance de Langson. [Malarial cachexia, pp. 782–783.]

Baetge (P.) Behandlung der Malaria tertiana mit Neosalvarsan.—*München. Med. Wochenschr*, 1913. Dec. 16. Vol. 60. No. 50, pp. 2776–2778.

Baldoni (Alessandro). Sulla Determinazione Quantitative della Chinina nelle Urine e nel Sangue.—Vol. *In Onore del Professore Angelo Celli nel 25° Anno di Insegnamento*, pp. 235–258. 1913. (Turin: Unione Tip.-Editrice Torinese.)

Bass (C. C.). Eradication of Malaria.—*Inter-State Med. Jl.*, 1913. Oct. Vol. 20. No. 10, pp. 921–926.

Bates (John Pelham). A Review of a Clinical Study of Malarial Fever in Panama.—*Jl. Trop. Med. & Hyg.*, 1913. Oct. 1. Vol. 16. No. 19, pp. 297–301.

Bruce (David), Harvey (David), Hamerton (A. E.) & Lady Bruce. *Plasmodium cephalophi*, sp., nov.—*Proc. Roy. Soc.*, 1913. Oct 1. Vol. B 87. No. B 592, pp. 45–47. With 2 coloured plates.

Cacace (Ernesto). Igiene Antimalarica Scolastica. Comunicazione all' VIII Congresso Pediatrico Italiano in Bologna ed al 1. Congresso dei Medici Scolastici Italiani in Milano.—*Propaganda Antimalarica*, 1913. Oct. 31. Vol. 6. No. 5, pp. 115–117.

Carter (Henry R.). Malaria in North China.—*U.S. Public Health Rep.*, 1913. Dec. 19. Vol. 28. No. 51, pp. 2739–2760.

Cartolari (Enrico). Splenectomia per Milza malarica, ipermegalica ed ectopica.—*Gazz. d. Ospedali e Cliniche*, 1913. Nov. 9. Vol. 34. No. 134, pp. 1399–1402.

von Celebrini (Emil). Malariabekämpfung im österreichischen Küstenlande.—*Das oesterreich. Sanitätswesen*, 1913. Nov. 27. Vol. 25. No. 48, pp. 1593–1599; and *Wiener. Med. Wochenschr.* 1913. Nov. 29. Vol. 63. No. 49. pp. 3141–3146.

Celli (Angelo). La Malaria in Italia durante il 1911. Ricerche Epidemiologiche e Profilattiche.—*Propaganda Antimalarica*, 1913. Oct. 31. Vol. 6. No. 5, pp. 97–106.

Cutter (John Ashburton). Neosalvarsan and Malaria. A Personal Experience.—*New York Med. Rec.*, 1913. Nov. 1. Vol. 98. No. 18. [Whole No. 1822.] pp. 864–865.

Dumolard, Aubry & Granger (M.), De l'Aortite Paludéenne.—*Rev. Med. d'Alger*, 1913. Dec., pp. 1–25. With 2 plates.

Falcioni (Domenico). Osservazioni Epidemiologiche, Profilattiche Curative fatte durante la Campagna Antimalarica, 1911. Vol. *In Onore del Professore Angelo Celli nel 25° Anno di Insegnamento*, pp. 305–323. (1913. Turin: Unione Tip.-Editrice Torinese.)

Fontoynont & Razafimpanilo. Du Traitement du Paludisme par l'Hectine.—*Rev. de Med. et d'Hyg. Trop.*, 1913. Vol. 10. No. 2, pp. 77–81.

Fraga (Cl.). Le Foie dans le Paludisme Chronique (Etude de son Etat physique et fonctionnel.)—*Rev. de Med.*, 1913. Oct. 10. Vol. 33. No. 10, pp. 816–828.

Gasbarrini (Antonio). Das Bordet-Gengousche Phänomen (Komplementablenkung) bei Malaria.—*Zeitschr. f. Immunitätsforsch. u. experiment. Therapie.* 1. Teil., Orig., 1913. Nov. 24. Vol. 20. No. 1–2, pp. 178–197.

Grothusen. Ein Beitrag zur Behandlung der Malaria.—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Nov. Vol. 17. No. 22, pp. 783–785.

Gunasekara (S. T.). Report on the Anti-Malarial Campaign at Kurunegala.—13 pp. folio. With 4 plates and 4 maps and a chart. (1913. Colombo: Printed by H. C. Cottle, Government Printer, Ceylon).

de Haan (J.). Ueber das Vorkommen der Wassermannschen Reaktion bei akuten Malariakrankheiten in den Tropen.—*Arch. f. Schiffs- u. Trop. Hyg.* 1913. Oct. Vol. 17. No. 20, pp. 693–705.

Heiser (Victor G.). Malaria in the Newborn. [Correspondence.]—*Med. Record*, 1913. Nov. 8. Vol. 84. No. 19, p. 855.

Henson (Graham E.). Malaria. Etiology, Pathology, Diagnosis, Prophylaxis and Treatment. With an introduction by Charles C. Bass.—190 pp. With 27 illustrations. 1913. London: Henry Kimpton. Glasgow: Alexander Stenhouse. [Price 10s. 6d. net.]

Horowitz (Josef). Bodenassanierung zur Bekämpfung der Malaria in Dalmatien.—*Das Oesterreichische Sanitätswesen*, 1913. Oct. 2. Vol. 25. No. 40, pp. 1345–1350.

Howe (W. B. W.). The Propagation of Tertian Malaria in the Mountains of North Carolina, Henderson County in particular.—*Southern Med. Jl.*, 1913. Nov. Vol. 6. No. 11, pp. 732–733.

KENRICK (W. H.). Malaria and Colour.—*Indian Med. Gaz.*, 1913. Dec. Vol. 48. No. 12, pp. 473–474.

KÜLZ (L.). Selbstversuch mit einer neuen Prophylaxis auf Grund der Malariaprodrome.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1913. Dec. Vol. 17. No. 23, pp. 834-835.

LAMBALLE (F. W.). The Utility of Enzymes in Malaria.—*Jl. R. Army Med. Corps*, 1913. Dec. Vol. 21. No. 6, pp. 660–669. and *Medical Record*, 1913. Nov. 27. Vol. 84. No. 21, pp. 928–931.

LEGER (MARCEL). Le Paludisme en Corse.—*Ann. Inst. Pasteur*, 1913. Sept. Vol. 27. No. 9, pp. 765–793.

——(M.) & BOUILLIEZ (M.). Recherches expérimentales sur *Plasmodium inui* Halberstädter et Prowazek d'un *Macacus cynomolgus*.—*Ann. Inst. Pasteur*, 1913. Nov. 25. Vol. 27, No. 11, pp. 955–985.

LONG (Sydney H.). Mosquitos and Malaria: A Correction. [Correspondence.]—*Brit. Med. Jl.*, 1913. Dec. 13. p. 1563.

LUGO-VINA Y CARTA (Nicasio). La Tifomalaria y su Terapéutica Clinica.—*Semana Medica*, 1913. Sept. 25. Vol. 20. No. 39. (No. 1028), pp. 714–717.

MCCULLOCH (H. D.). Irradiation of the Spleen in Malaria and Other Affections.—*Med. World*, 1913. Oct. 9. Vol. 1. No. 10., pp. 370–371.

MACGILCHRIST (A. C.). The Probable Ratio of Relapses and Fresh Infections to the Total Attacks of Malarial Fever, and a Discussion of Quinine Dosage.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 339-346.

——A Plea for a More Extended use of Quinine Alkaloid.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 347–351.

MANTEUFEL. 12 Jahre Malariabekämpfung nach dem von Robert Koch angegebenen Verfahren.—*Zeitschr. f. Hyg. u. Infektionskr.* 1913. Dec. 12. Vol. 76. No. 2, pp. 350–360.

MARCHIAFAVA (Ettore). Sopra la Infezione Malarica Perniciosa nello Scorcio dell'Autunno.—*In Onore del Professore Angelo Celli nel 25° Anno di Insegnamento*, pp. 813–825. (1913. Turin: Unione Tip. Editrice Torinese.)

MARTELLI (Pier Nello). La Campagna Antimalarica ad Alberese (Grosseto).—*Propaganda Antimalarica*, 1913. Aug. 31. Vol. 6. No. 4, pp. 81–92.

MOREAU (Laurent). Prophylaxie du Paludisme dans l'Afrique Orientale Allemande.—*Bull. Soc. Path. Exot*, 1913. Oct. Vol. 6. No. 8, pp. 569–571.

MYERS (A. A.). Suppurative Parotitis after Malaria. [Memoranda.]—*Brit. Med. Jl.*, 1913. Dec. 27, p. 1626.

[The title sufficiently indicates the contents of this paper.]

NARDELLI (Giulio). Ricerca della Chinina nel Luogo d'Iniezione. Vol. *In Onore del Professore Angelo Celli nel 25° Anno di Insegnamento*, pp. 227–233. (1913. Turin: Unione Tip. Editrice Torinese).

NOLAND (Lloyd) & WATSON (F. C.). Spontaneous Rupture of the Malarial Spleen: A Report of Three Cases.—*Proc. Canal Zone Med. Assoc. for Half Year, April to Sept.*, 1912. Vol. 5. Part 1., pp. 108–114.

O'CONNELL (Matthew D.). The Meteorology of Malaria.—*Jl. Trop. Med. and Hyg.*, 1913. Dec. 1. Vol. 16. No. 23, pp. 361–362.

ORENSTEIN (A. J.). Screening as an Antimalaria Measure: A Contribution to the Study of the Value of Screened Dwellings in Malarial Regions.—*Proc. Canal Zone Med. Assoc. for Half Year, April to Sept.*, 1912. Vol. 5. Part 1, pp. 12–17. With a map.

PARHAM (F. W.). Quinine and Tetanus.—*New Orleans Med. and Surg. Jl.*, 1913. Oct. Vol. 66. No. 4, pp. 302–309.

PARROT (L. M.). Sur l'Administration des Sels de Quinine en Médecine infantile.—*Rev. de Med. et d'Hyg. Trop.*, 1913. Vol. 10. No. 2, pp. 89–92.

PATTERSON (J. F.). The Cerebral Form of Pernicious Malaria.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 15. Vol. 61. No. 20, pp. 1807–1809.

PEPE (T.). Febbri comitate.—*Gazz. d. Ospedali e. d. Cliniche*, 1913. Sept. 21. Vol. 34. No. 113, pp. 1175–1176.

QUÉNU & DEGRAIS. Splénomégalie d'Origine paludique traitée avec Succès par le Radium.—*Bulls. et Mems. Soc. de Chirurgie de Paris*, 1913. Nov. 18. Vol. 39. No. 34, pp. 1449–1451.

ROSSI (Giacomo). Risultati di una Inchiesta sulle Condizioni Malariche e sulla Lotta Agricolo-antimalarica nelle Provincie di Benevento, Caserta e Salerno.—*Propaganda Antimalarica*, 1913. Oct. 31. Vol. 6. No. 5, pp. 107–115.

RUGE. Schwierigkeiten bei der Chininprophylaxe.—*Jl. State Med.*, 1913. Sept. Vol. 21. No. 9, pp. 564–567.

SERGENT (Edm. & Et.), BÉGUET (M.), & PLANTIER (A.). Sur la Culture *in vitro* du Parasite du Paludisme, d'après la Méthode de Bass.—*Compt. Rend. Soc. Biol.*, 1913. Oct. 31. Vol. 75. No. 30, pp. 324–326.

—— & —— & ——Observations microscopiques au Cours d'un Accès pernicieux paludéen.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 615–617. With 1 coloured plate.

SHEARD, Jr. (Charles). A Case of Malaria treated with Neosalvarsan.—*Canadian Practitioner and Review*, 1913. Oct. Vol. 38. No. 10, pp. 588–591.

SUMMA. Zwei Malaria-tertiana-Rückfälle unmittelbar nach energischer Salvarsanbehandlung.—*Arch. f. Schiffs- u. Trop.- Hyg.*, 1913. Dec. Vol. 17. No. 23, pp. 836–837.

THOMPSON (H. N.). The Prophylactic Use of Quinine.—*Jl. R. Army Med. Corps.*, 1913. Nov. Vol. 21. No. 5, pp. 587–589.

THOMSON (John Gordon and David). The Growth and Sporulation of the Benign and Malignant Tertian Malarial Parasites in the Culture Tube and in the Human Host.—*Proc. Roy. Soc.*, 1913. Oct. 1. Vol. B 87. No. B 592, pp. 77–87. With 1 coloured plate and *Ann. Trop. Med. and Parasit.* 1913. Dec. 30. Vol. 7. No. 4, pp. 509–524. With 2 plates.

TISSIER & BRUMPT. A propos d'un Cas de Paludisme congénital.—*Arch. Mensuelles d'Obstétr. et de Gynécol*, 1913. Feb. Vol. 2. No. 2, pp. 166–174. With 3 text figs.

UNTERBERGER (S.). Ueber Malariabekämpfung. (Nach den Vortragen auf dem Washingtoner internationalen Hygien. Kongress im Jahre 1912).—*Petersburg. Med. Zeitschr.*, 1913. Sept. 15 (28). Vol. 38. No. 18, pp. 221–222.

VINSON (L.). Contribution à l'Etude de la Malaria. Les Modes d'Administration de la Quinine.—*Bull. Soc. Med. de l'Ile Maurice*, 1913. July-Aug.-Sept. Vol. 31. 2me. Série. No. 33, pp. 37–44.

VORTISCH-van VLOTEN (H.). Zu dem Aufsatze von Dr. Justi: Zur Methodik der Chinindarreichung bei Malaria, Heft 15, 1913 d. A.—*Arch. f. Schiffs- u. Trop.- Hyg.*, 1913. Nov. Vol. 17. No. 21, p. 750.

WATSON (Malcolm). Mosquito Reduction and the Consequent Eradication of Malaria.—*Trans. Soc. Trop. Med. and Hyg.*, 1913. Dec. Vol. 7. No. 2, pp. 59–70.

MYIASIS.

Jones (Glenn I.). Hepatic Abscess (Non-Amebic) and Gastro-Intestinal Myiasis.—*Jl. Amer. Med. Assoc.*, 1913. Oct. 18. Vol. 61. No. 16, p. 1457.

de Moura (Cursino). Myiase do Seio.—*Rev. Med. de S. Paulo*, 1913. Jan. 15. Vol. 16. No. 1, p. 1.

Wohl (Michael G.). Myiasis, or Fly Larvae as Parasites of Man. With Report of a Case.—*New York Med. Jl.*, 1913. Nov. 22. Vol. 98. No. 21. [Whole No. 1825.] pp. 1018–1020.

Zepeda (Pedro). Nouvelle Note concernant les Moustiques qui propagent les Larves de *Dermatobia Cyaniventris* et de *Chrysomia Macellaria* et peut-être celle de Lund et de la *Cordilobia Anthropophaga*.—*Rev. de Med. et Hyg. Trop.*, 1913. Vol. 10. No. 2, pp. 93–95.

PAPPATACI FEVER.

Birt (C.). Phlebotomus Fever and Dengue.—*Jl. R. Army Med. Corps.* 1913. Oct. Vol. 21. No. 4, pp. 389–401.

——. Phlebotomus Fever and Dengue.—*Brit. Med. Jl.*, 1913. Nov. 15, pp. 1297–1298.

Howlett (F. M.). The Natural Host of *Phlebotomus minutus*.—*Indian Jl. Med. Research*, 1913. July. Vol. 1. No. 1, pp. 34–38. With a map and 1 plate.

Loughnan (W. F. M.). Phlebotomus Fever and Pappataci Flies in Aden.—*Jl. R. Army Med. Corps.*, 1913. Oct. Vol. 21. No. 4, pp. 402–405.

Mansion (J.). Les Phlébotomes en Corse.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 637–641. With 1 fig.

Wenyon (C. M.). The length of Life of *Phlebotomus* in Captivity. A Note on a Method of Keeping the Flies alive for Experimental Work.—*Jl. London School Trop. Med.*, 1913. Nov. Vol. 2. Part 3, pp. 170-171.

PELLAGRA.

Alpago-Novello (Luigi). Relazione del Presidente Dottor Luigi Alpago-Novello a S. E. il Ministro di Agricoltura Industria e Commercio.—*Riv. Pellagrologica Italiana*, 1913. Sept. Vol. 13. No. 5, pp. 67–69, and Nov. No. 6, pp. 86–89.

Bailey (R. T.). Two Cases of Pellagra.—*British Guiana Med. Ann. for* 1912, pp. 115–118.

Barcroft-Anderson (J.). Notes on a Case of Pellagra.—*S. African Med. Rec.*, 1913. Oct. 25. Vol. 11. No. 20, pp. 436-437. With 1 fig.

Bartholow (Paul). The Etiology of Pellagra. A Review of Recent Theories.—*New York Med Jl.*, 1913. Dec. 27. Vol. 98. No. 26. [Whole No. 1830], pp. 1262–1263.

Drummond (J.). Pellagra in Durban. With Discussion.—*S. African Med. Rec.*, 1913. Oct. 11. Vol. 11. No. 19, pp. 416–419.

Ferrannini (L.). La Pellagra in Inghilterra.—*Riforma Medica*, 1913. Oct. 11. Vol. 29. No. 41, pp. 1135–1136.

Finato (D. ri L.) & Novello (F.). Ricerche sulla Ipersensibilità dei Pellagrosi.—*Gaz. Internaz. Med. Chirurg. Igiene*, 1913. Nov. 1. No. 44, pp. 1038–1044.

Funk (Casimir). Studies on Pellagra. 1. The Influence of the Milling of Maize on the Chemical Composition and the Nutritive Value of Maize-meal.—*Jl. of Physiology*, 1913. Dec. 19. Vol. 47. No. 4–5, pp. 389–392.

Gehring (Edwin W.). Pellagra in Maine.—*Jl. Amer. Med. Assoc.*, 1913. Dec. 20. Vol. 61. No. 25, pp. 1212–1213.

HARRIS (William H.). The Transmission of Pellagra from Man to Monkey.—*New Orleans Med. and Surg. Jl.*, 1913. Nov. Vol. 66. No. 5, pp. 385–386.

HOGG (C. A.). Cases of Pellagra-like Skin Lesions in Australia.—*Australasian Med. Gaz.*, 1913. Oct. 18. Vol. 34. No. 16. [No. 457], pp. 357–363. With 3 figs.

JOHNSTONE (Emma M.). A Note on a Case of Pellagra.—*Lancet*, 1913. Oct. 18, pp. 1114–1115. With 2 figs.

LAVINDER (C. H.). Pellagra in Mississippi. Its Reported Prevalence and Geographic Distribution.—*U.S. Public Health Rep.*, 1913. Oct. 3. Vol. 28. No. 40, pp. 2035–2038.

——. Pellagra. Brief Comments on our Present Knowledge of the Disease.—*U.S. Public Health Rep.*, 1913. Nov. 21. Vol. 28. No. 47, pp. 2461–2463.

MACDONALD (J. B.). Notes on Pellagra in Massachusetts, with Report of Two Cases in Danvers State Hospital.—*Boston Med. and Surg. Jl.*, 1913. Oct. 16. Vol. 169. No. 16, pp. 567–571. With 2 text figs.

MENSE (C.). Reisebeobachtungen über Pellagra.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1913. Nov. Vol. 17. No. 22, pp. 788–793.

MEREDITH (Duane). A Report of Research Work on Pellagra, with Isolation of Possible Causative Factor.—*Texas State Jl. of Med.*, 1913. Oct. Vol. 9. No. 6, pp. 191–192.

OBREGIA (A.) & PITULESCO. La Séro-Réaction d'Abderhalden dans la Pellagre.—*Compt. Rend. Soc. Biol.*, 1913. Dec. 19. Vol. 75. No. 36, pp. 587–588.

RAINSFORD (F. E.). On a Fatal Case of Pellagra in an Insane Patient.—*Lancet*, 1913. Dec. 20, pp. 1759–1760.

RONDONI (Pietro). Sulla Ipersensibilità delle Cavie Maidizzate di Fronte al Siero di Sangue dei Pellagrosi, con Considerazioni sulla Genesi della Pellagra.—*Riv. Pellagrologica Italiana*, 1913. Nov. Vol. 13. No. 6, pp. 84–86.

SPURGIN (W. H.). Acute Pellagra or Dermatitis exfoliativa.—*New York Med. Jl.*, 1913. Nov. 29. Vol. 98. No. 22. [Whole No. 1826], pp. 1070–1071.

STANNUS (Hugh S.) Pellagra in Nyasaland. (Second Communication).—*Trans. Soc. Trop. Med. and Hyg.*, 1913. Nov. Vol. 7. No. 1, pp. 32–56. With 4 maps and 1 diagram.

VOLPINO (G.) and BORDONI (E. F.). E Possibile un'Immunizzazione Attiva dei Pellagrosi ?—*Pathologica*, 1913. Oct. 15. Vol 5. No. 119, pp. 602–605, and *Riv. Pellagrologica Italiana*, 1913. Nov. Vol. 13. No. 6, pp. 81–84.

WEISS (Ettore). La Pellagra nel Tirolo meridionale e l'Azione del Governo contro la Stessa. *Riv. Pellagrologica Italiana*, 1913. Nov. Vol. 13. No. 6, p. 90.

PLAGUE.

BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIENE PUBLIQUE, 1913. Sept. Vol. 5. No. 9, pp. 1544–1551. Prophylaxie de la Peste dans le Gouvernement d'Astrakhan (Russie) Communication de la Commission Impériale pour la Lutte contre la Peste.

DALEY (W. Allen). Rats and their Extermination.—*Public Health*, 1913. Oct. Vol. 27. No. 1, pp. 23–28.

DEUTMANN (A. A. F. M.). The Plague in Karangloo during the Months May–June–July, 1911.—*Mededeelingen v. d. Burgerlijken Geneesk. Dienst in Nederl.-Indie.* 1912. Vol. 1b, pp. 58–138. With 10 Maps.

van DRIEL (B. M.). Pestbestrijding te Shanghai.—*Geneesk. Tijdschr. v. Nederl.-Indie*, 1913. Vol. 53. No. 5, pp. 656–671. With 1 map.

Gioseffi (M.). La Difesa contro la Peste nel porto di Trieste ed in quello di Genova. Peste Umana e Peste Murina.—*Gazz. d. Ospedali e d. Cliniche*, 1913. Dec. 4. Vol. 34. No. 145, pp. 1519–1520.

Grysez (V.) & Certain (B.). Sur la Vaccination contre la Peste par la Voie conjonctivale à l'Aide de Bacilles sensibilisés vivants.—*Compt. Rend. Soc. Biol.*. 1913. Oct. 24. Vol. 75. No. 29, pp. 281–283.

de Haan (J.). The Bacteriological Diagnosis of Plague in the District of Malang.—*Mededeelingen v. d. Burgerlijken Geneesk. Dienst in Nederl.-Indie*. 1912. Vol. 1a., pp. 2–28.

Kitasato (S.). Ueber die Pest. Die Wichtigkeit des "Rattenflohes" zur Festellung der Verbreitung von Pest. (Nach einen Vortrag gehalten in dem XVII Internationalen medizinischen Kongress, London, 1913).—*Berlin. Klin. Wochenschr.*, 1913. Oct. 13. Vol. 50. No. 41, pp. 1881–1884.

van Loghem (J. J.). Some Epidemiological Facts concerning the Plague in Java.—*Mededeelingen v. d. Burgelijken Geneesk. Dienst in Neder.-Indie.*, 1912. Vol. 1b., pp. 2–56. With 22 figs.

Pech. Epidémiologie d'Armée. La Peste de Jaffa.—*Caducée*, 1913. Nov. 15. Vol. 13. No. 22, pp. 299–302; Dec. 6. No. 23. pp. 315–316; Dec. 20. No. 24, pp. 328–329.

de Raadt (O. L. E.). Extracts from the Reports of Dr. O. L. E. de Raadt.—*Mededeelingen v. d. Burgerlijken Geneesk. Dienst in Nederl.-Indie*, 1912. Vol. 1 b., pp. 140–151. With 11 figs.

Row (R.). Vaccine Treatment in Bubonic Plague. [Memoranda.]—*Brit. Med. Jl.*, 1913. Oct. 18, p. 1021.

Sacquépée & Garcin. La Peste des Ouled Fredj (Maroc). La Peste des Animaux domestiques. Remarques sur la Contagion de la Peste et sur sa Prophylaxie.—*Arch. de Med. et de Pharm. Militaires*, 1913. Dec. Vol. 62. No. 12, pp. 561–579.

Simpson (Friench). Rat Proofing a Municipal Sewer System. A Report of an Investigation to find a Practical Method of Rat Proofing the Sewer System of San Francisco.—*U.S. Public Health Rep.*, 1913. Oct. 31. Vol. 28. No. 44, pp. 2283–2290.

Swellengrebel (N. H.). Record of Observations on the Bionomics of Fleas and Rats and on Other Subjects, bearing on the Epidemiology of Plague in Eastern Java. (A Report to the Inspector-in-Chief of the Civil Medical Service in Netherland's India).—*Mededeelingen v. d. Burgerlijken Geneesk. Dienst in Nederl. Indie*, 1913. Vol. 2. No. 1. 90 pp. With 3 figs., 9 maps and 13 curves.

Teague (Oscar). A Further Note upon the Influence of Atmospheric Temperature upon the Spread of Pneumonic Plague.—*Philippine Jl. Science*, Sect. B., Trop. Med., 1913. June. Vol. 8. Sec. B. No. 3, pp. 241–252.

Tulloch (W. J.). The Bacteriological Diagnosis of a Case of Plague.—*Lancet*. Nov. 8., p. 1318.

de Vogel (W. Th.). Extract from the Report to the Government on the Plague Epidemic in Malang (Isle of Java), November 1910 till August 1912—*Mededeelingen van den Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indie*, 1912. Vol. 1a, pp. 30–111. With 43 figs., 12 charts, and 54 maps.

Wu Lien Teh (G. L. Tuck). First Report of the North Manchurian Plague Prevention Service.—*Jl. of Hygiene*, 1913. Oct. Vol. 13. No. 3, pp. 237–290. With 11 plates, 1 map and 4 plans.

RELAPSING FEVER (and Spirochaetosis).

Balfour (Andrew). Recent Views on Syphilis, Spirochaetosis, and Sleeping Sickness. [Correspondence.]—*Brit. Med. Jl.*, 1913. Dec. 13, pp. 1560–1561.

Blanchard (M.). Epidémie de Spirochétose humaine à Bikié (Congo français).—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 559–560.

Chalmers (Albert J.) & O'Farrell (W. R.). Bronchial Spirochaetosis. —*Jl. Trop. Med. and Hyg.*, 1913. Nov. 1. Vol. 16. No. 21, pp. 329–334.

Drake-Brockman (R. E.). On the Occurrence of an Epidemic of Relapsing Fever in Bulhar, British Somaliland.—*Jl. London School Trop. Med.*, 1913. Nov. Vol. 2. Part 3, pp. 195–199. With 2 charts.

Flourens. Doses limites auxquelles le Chlorhydrate d'Emétine et le Chlorhydrate de Quinine peuvent être employés chez le Calfat.— *Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 642–644.

Hahn (Benno) & Kostenbader. Beitrag zur Erklärung der Wirkungsweise des Quecksilbers bei den Spirillosen.—*Berlin. klin. Wochenschr*, 1913. Nov. 24. Vol. 50. No. 47, pp. 2185–2186.

Hata (S.). A Contribution to our Knowledge of the Cultivation of *Spirochaeta recurrens*.—*Centralbl. f. Bakt.* 1. Abt. Orig., 1913. Nov. 26. Vol. 72. No. 1–2, pp. 107–112. With 1 fig.

Hügel (G.). Experimentelle Beiträge zur chemotherapeutischen Wirkung von organischen Antimonpräparaten bei Spirochaeten- und Trypanosomenerkrankungen.—*Arch. f. Dermatologie u. Syphilis.* Orig., 1913. Sept. Vol. 118. No. 1, pp. 1–60.

Humphry (A. D.). Relapsing Fever in the Darjeeling District. [Correspondence.]—*Indian Med. Gaz.*, 1913. Nov. Vol. 48. No. 11, p. 451.

Launoy. Le Fer du Sang chez la Poule normale et dans l'Infection par le *Spirochaeta gallinarum* Marchoux et Salimbeni.—*Compt. Rend. Soc. Biol.*, 1913. Oct. 24. Vol. 75. No. 29, pp. 248–249.

—— (L.) & Lévy-Bruhl (M.). Sur l'Anémie observée chez la Poule au Cours de l'Infection par le *Spirochaeta gallinarum*.—*Compt. Rend. Soc. Biol.*, 1913. Oct. 24. Vol. 75. No. 29, pp. 250–252.

—— & ——. L'Infection Spirillaire chez les Poules Ethyroïdées, Pouvoir Vaccinant de leur Sérum.—*Compt. Rend. Soc. Biol.*, 1913. Nov. 14. Vol. 75. No. 31, pp. 352–354.

Logan (O. T.). Relapsing Fever. The Relation of Rise and Defervescence of Temperature to the Appearance and Disappearance of Spirochaetae in the Peripheral Blood.—*China Med. Jl.*, 1913. Sept. Vol. 27. No. 5, pp. 321–324.

Smith (C. H.) & Graham (G. F.). Relapsing Fever in Chitral with an Account of Successful Animal Inoculations.—*Indian Med. Gaz.*, 1913. Oct. Vol. 48. No. 10, pp. 381–382.

Swift (Homer F.) & Ellis (Arthur W. M.). A Study of the Spirochaeticidal Action of the Serum of Patients treated with Salvarsan.—*Jl. Experimental Med.*, 1913. Oct. 1. Vol. 18. No. 4, pp. 435–449.

Taylor (H. B.). Relapsing Fever. The relation of Rise and Defervescence of Temperature to the Appearance and Disappearance of Spirochaetae in the Peripheral Blood; with Notes on Treatment by Salvarsan.—*China Med. Jl.*, 1913. Sept. Vol. 27. No. 5, pp. 318–320.

Toyoda (Hidezo). Ueber die Entwicklung von Rekurrensspirochäten in der Kleiderlaus.—*Zeitschr. f. Hyg. u. Infektionskr.* 1913. Dec. 12. Vol. 76. No. 2, pp. 313–320. With 1 plate.

Uhlenhuth (P.) & Hügel (G.). Weitere Mitteilungen über die chemotherapeutische Wirkung neuer Antimonpräparate bei Spirochäten- und Trypanosomenkrankheiten.—*Deut. Med. Wochenschr*, 1913. Dec. 11. Vol. 39. No. 50, pp. 2455–2457.

SKIN.—TROPICAL DISEASES OF THE.

ARAGAO (Henrique de Beaurepaire) & VIANNA (Gaspar). Untersuchungen ueber das Granuloma venereum.—*Memorias do Instituto Oswaldo Cruz*, 1913. Vol. 5. No. 2, pp. 211–238. With 7 plates.

CHALMERS (Albert J.) & O'FARRELL (W. R.). Pyosis tropica in the Anglo-Egyptian Sudan.—*Jl. Trop. Med. and Hyg.*, 1913. Dec. 15. Vol. 16. No. 24, pp. 377–379.

—— & ——. The Trichonocardiases.—*Ann. Trop. Med. and Parasit.*, 1913. Dec. 30. Vol. 7. No. 4, pp. 525–540. With 2 plates.

—— & ——. Epidemic Trichonocardiasis.—*Ann. Trop. Med. and Parasit.*, 1913. Dec. 30. Vol. 7. No. 4, pp. 541–544. With 2 figs.

CULPEPPER (Wm. Louis). A Case of Dhobie Itch (Tinea cruris), with Notes on the Cultivation of the Causal Fungus (*Epidermophyton rubrum*).—*Amer. Jl. Trop. Diseases and Preventive Med.*, 1913. Nov. Vol. 1. No. 5, pp. 397–401.

de FREITAS (Q. B.). Further Notes on a Case of Pinta in an Insane Patient.—*British Guiana Medical Annual for* 1912, pp. 99–100. With 3 plates.

KERSTEN (H. E.). Einiges über Neosalvarsan bei verschiedenen tropischen Hautkrankheiten.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1913. Sept. Vol. 17. No. 18, pp. 627–636.

PINOY (E.). Actinomycoses et Mycétomes.—*Bull. Inst. Pasteur*, 1913. Nov. 15. Vol. 11. No. 21, pp. 929–938. With 7 figs.; and Nov. 30. No. 22, pp. 977–984. With 5 figs.

SABELLA (Pietro). Di alcune Affezioni Granulomatose della Cute osservate a Tripoli.—Studio clinico, istologico, sperimentale.—*Giorn. Ital. d. Mal. ven. e d. Pelle*, 1913. July 10. Vol. 48. No. 3, pp. 306–330. With 4 plates.

TERRA (F.) & RABELLO (Ed.). Le Granulome ulcéreux et sa Cure.—*Bol. Soc. Brasileira de Dermatologia*, 1913. Vol. 2. No. 1, pp. 3–12.

SMITH (J. E.). A Note on Pinta.—*Amer. Jl. Trop. Diseases and Preventive Med.*, 1913. Nov. Vol. 1. No. 5, p. 402. With 1 plate.

WISE (K. S.). Granuloma Pudendi and its Parasite.—*British Guiana Medical Annual for* 1912, pp. 54–64.

SLEEPING SICKNESS (and other Trypanosomiases).

ANDREWS (W. H.). Some experiments on the Drug Trea ment of Trypanosomiasis.—*Union of S. Africa Dept. of Agriculture. Second Report of the Director of Veterinary Research*, 1912. Oct., pp. 362–383. (1913. Cape Town: Cape Times, Ltd., Government Printers).

AUBERT (P.), MONFORT (F.), HECKENROTH (F.), & BLANCHARD (M.). Le Salvarsan dans la Prophylaxie et le Traitement de la Trypanosomiase humaine.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 632–634.

BALFOUR (Andrew). Recent Views on Syphilis, Spirochaetes, and Sleeping Sickness. (Correspondence).—*Brit. Med. Jl.*, 1913. Dec. 27, p. 1647.

BATTAGLIA (Mario). Einige durch Trypanosomiasis Dromedarii erzeugte Läsionen.—*Centralbl. f. Bakt.* I. Abt. Orig., 1913. Vol. 71. No. 2–3, pp. 182–184.

BLACKLOCK (B.) & YORKE (Warrington). The Trypanosomes causing Dourine (Mal de Coït or Beschälseuche).—*Proc. Roy. Soc.*, 1913. Oct. 16. Vol. B 87. No. B 593, pp. 89–96. With 1 plate.

—— & ——. *Trypanosoma virax* in Rabbits.—*Ann. Trop. Med. and Parasit.*, 1913. Dec. 30. Vol. 7. No. 4, pp. 563–568.

BLACKLOCK (B.) & YORKE (Warrington). The Probable Identity of *Trypanosoma congolense* (Broden) and *T. nanum* (Laveran).—*Ann. Trop. Med. and Parasit*, 1913. Dec. 30. Vol. 7. No. 4, pp. 603–607.

BLANCHARD (M.). Variations spontanées de l'Infection sanguine chez quelques Malades du Sommeil.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 581–583.

BRAUN (H.). Ueber Immunität bei Trypanosomen.—*Prager med. Wochenschr.* 1913. Dec. 4. Vol. 38. No. 49, pp. 673–675.

BROWN (Alexander). Notes of a Case of Sleeping Sickness found on the Hills, Twenty-two Miles north of Serenje, in North Rhodesia.—*Jl. Trop. Med. and Hyg.*, 1913. Oct. 1. Vol. 16. No. 19, pp. 302–303.

BRUCE (David), HARVEY (David), HAMERTON (A. E.) & Lady BRUCE. Trypanosome Diseases of Domestic Animals in Nyasaland, iii.—*Trypanosoma pecorum.*—*Proc. Roy. Soc.*, 1913. Oct. 1. Vol. B, 87. No. B, 592, pp. 1–26.

——, ——, ——, & ——. Morphology of Various Strains of the Trypanosome causing Disease in Man in Nyasaland.—The Mzimba Strain.—*Proc. Roy. Soc.*, 1913. Oct. 1. Vol. B 87. No. B 592, pp. 26–35. With 3 plates.

——, ——, ——, & ——. The Trypanosome causing Disease in Man in Nyasaland. Susceptibility of Animals to the Human Strain.—*Proc. Roy. Soc.*, 1913. Oct. 1. Vol. B 87. No. B 592, pp. 35–45.

——, ——, ——, & ——. Trypanosomes of the Domestic Animals in Nyasaland. 1.—*Trypanosoma simiae*, sp. nov. Part 2. The Susceptibility of Various Animals to *T. simiae*.—*Proc. Roy. Soc.*, 1913. Oct. 1. Vol. B 87. No. B 592, pp. 48–57.

——, ——, ——, & ——. Trypanosome Diseases of Domestic Animals in Nyasaland. 1.—*Trypanosoma simiae*, sp. nov. Part 3.—*Proc. Roy. Soc.*, 1913. Oct. 1. Vol. B 87. No. B 592, pp. 58–66. With 3 plates.

CARPENTER (G. D. Hale). Second Report on the Bionomics of *Glossina fuscipes* (*palpalis*) of Uganda.—*Rep. of the Sleeping Sickness Commission of the Royal Society.* No. 14. 1913, pp. 1–37. With 36 figs. and 4 charts.

——. Big Game and Sleeping Sickness versus Man and his Animals. [Correspondence.]—*Lancet*, 1913. Nov. 29, p. 1587.

CHAGAS (Carlos). Revisao do Cyclo evolutivo do *Trypanosoma cruzi*.—*Brazil Medico*, 1913. June 15, p. 225.

CHALMERS (Albert J.) & KING (Harold H.). The Distribution of *Glossina longipennis* (Corti, 1895).—*Jl. Trop. Med. and Hyg.*, 1913. Oct. 15. Vol. 16. No. 20, pp. 320–322. With a map.

da COSTA (Bernardo F. Bruto). Sleeping Sickness in the Island of Principe. Sanitation, Statistics, Hospital Services and Work of Official Conservancy Brigade. Translated by Lt.-Col. J. A. Wyllie. 90 pp. With 3 plates. (1913. London: Bailliére, Tindall and Cox). [Price 2s. 6d. net.]

——. Estudos Estatísticos sobre a Mortalidade Geral e sobre a Doença do Sono na Ilha do Príncipe desde 1908 até Julho de 1911.—*Arquivos de Higiene e Patologia Exóticas*, 1913. Oct. 31. Vol. 4, pp. 63–76. With 5 charts.

DANYSZ (J.). De l'Emploi de quelques Combinaisons médicamenteuses nouvelles dans le Traitement des Trypanosomiases.—*Compt. Rend. Acad. Sci.*, 1913. Oct. 20. Vol. 157. No. 16, pp. 644–646.

DIESING. Die Uebertragung der Schlafkrankheit durch den Geschlechtsakt.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1913. Nov. Vol. 17. No. 22, pp. 786–788.

DUKE (H. L.). Some Trypanosomes recovered from Wild Game in Western Uganda.—*Rep. of the Sleeping Sickness Commission of the Royal Society*, 1913. No. 14, pp. 37–59. With 4 plates and 1 map.

ECKARD (B.). Uebertragung des *Trypanosoma rhodesiense* durch die *Glossina palpalis*.—*Centralbl. f. Bakt.* 1. Abt., Orig., 1913. Nov. 26. Vol. 72. No. 1–2, pp. 73–76.

FRASER (A. D.) & DUKE (H. L.). Antelope infected with *Trypanosoma gambiense*.—*Rep. of the Sleeping Sickness Commission of the Royal Society*, 1913. No. 14, pp. 60–67. [Reprinted from *Proc. Roy. Soc.* 1912. Vol. B. 84.]

GORETTI (Guido). Ricerche Sperimentali sul Nagana. 3. Comunicazione. Contribuo allo Studio delle Alterazioni del Sistema Nervoso Centrale nell'Infezione sperimentale da Nagana (*Tripanosoma brucei*).—*Sperimentale*, 1913. Nov. 13. Vol. 67. No. 5, pp. 527–564. With 1 coloured plate.

GROSSULE (Virgilio). Esperienza sulle Scimmie col Siero Menharto contro la Malattia del Sonno.—*Gazz. d. Ospedali e d. Cliniche*, 1913 Oct. 23. Vol. 34. No. 127, p. 1327.

——. Sulla Guaribilita della Tripanosi o Malattia del Sonno.—*Gazz. d. Ospedali e d. Cliniche*, 1913. Oct. 30. Vol. 34. No. 130, pp. 1359–1361.

GUERREIRO (Cezar). Observacoes Urolojicas na Molestia de Carlos Chagas.—*Rev. Med. de S. Paulo*, 1913. Feb. 15. Vol. 16. No. 3, pp. 41–44.

HECKENROTH (F.) & BLANCHARD (M.). Recherches sur l'Existence des Propriétés trypanolytique, attachante, agglutinante et protectrice, dans le Sérum des Malades atteints de Trypanosomiase au Congo français.—*Ann. Inst. Pasteur*, 1913. Sept. Vol. 27. No. 9, pp. 750–764.

—— & ——. Le Néosalvarsan dans le Traitement de la Trypanosomiase humaine.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 591–592.

JOHNSTON (J. E. L.). A Case of Equine Trypanosomiasis characterized by the Occurrence of Posterior Nuclear Forms.—*Jl. Trop. Med. and Hyg.*, 1913. Nov. 15. Vol. 16. No. 22, pp. 348–349. With 1 text fig.

—— & MACFIE (J. W. Scott). Observations on the Action on Trypanosomes of Certain Drugs and of *Staphylococcus pyogenes*.—*Jl. London School Trop. Med.*, 1913. Nov. Vol. 2. Part 3, pp. 207–212.

LAVERAN (A.). Au Sujet des Infections des Souris par le *Trypanosoma duttoni*.- *Bull. Soc. Path. Exot.* 1913. Nov. Vol. 6. No. 9, pp. 626–627.

LEESE (A. S.). Some more Successful Experiments on the Treatment of Surra in the Camel, with Recommendations for Systematic Treatment.—*Mem. of Dept. of Agriculture in India.* Veterinary Ser., 1913. Apr. Vol. 1. No. 3, pp. 149-176.

LEVADITI (C.) & MUTERMILCH (St.). Anticorps et Espèces Animales.—*Ann. Inst. Pasteur*, 1913. Nov. 25. Vol. 27. No. 11, pp. 924–954.

MACFIE (J. W. Scott). Preliminary Note on the Development of a Human Trypanosome in the Gut of *Stomoxys nigra*.—*Ann. Trop. Med. and Parasitology*, 1913. Nov. 7. Vol. 7. No. 3 B, pp. 359–362. With 1 plate and 1 text fig.

—— & JOHNSTON (J. E. L.). Auto-Erythrophagocytosis as an Aid to the Diagnosis of Trypanosomiasis.—*Jl. London School Trop. Med.* 1913. Nov. Vol. 2. Part 3, pp. 212–215.

MARTOGLIO (F.). Sulla Morfologia del *Trypanosoma cellii*.—*Ann. d'Igiene Sperimentale*, 1913. Vol. 23. (New Ser.). No. 3, pp. 363–366.

Mello (Ugo). Le *Trypanosoma gambiense* a-t-il une affinité pour le Testicule ?—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 583–588.

Mendeleeff-Goldberg (Polina). Die Immunitätsfrage bei der Trypanosomenkrankheit der Frösche.—*Arch. f. Protistenkunde*, 1913. Oct. 10. Vol. 31. No. 2, pp. 241–276. With 2 plates and 9 text figs.

Mesnil (F.). Sur le Pouvoir Attachant du Sérum des Malades du Sommeil.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, p. 541.

Mitzmain (M. Bruin). The Mechanical Transmission of Surra by *Tabanus striatus* Fabricus.—*Philippine Jl. of Science*, Sect. B., Trop. Med., 1913. June. Vol. 8. No. 3, pp. 2239229.

Monfort (F.). Essais de Traitement des Trypanosomiases expérimentales par l'Arsénophénylglycine.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 588–590.

Nägler (Kurt). Experimentelle Studien über die Passage von *Schizotrypanum cruzi* Chagas durch einheimische Tiere.—*Centralbl. f. Bakt.* 1. Abt., Orig. 1913. Oct. Vol. 71. No. 23, pp. 202–206. With 1 plate.

Neave (Sheffield). Big Game and Sleeping Sickness versus Man and his Animals. [Correspondence.]—*Lancet*, 1913. Dec. 6, pp. 1664–1665.

Neiva (Arthur). Multiplicacao na Vinchuca (*Triatoma infestans* Klug) do Trypanosomo do Mal de Cadeiras.—*Brazil Medico*, 1913. Sept. 15. Vol. 27. No. 35, pp. 366–367.

——. Transmissao do *Trypanosoma cruzi* pelo *Rhipicephalus sanguineus* (Latr.)—*Brazil Medico*, 1913. Dec. 8. Vol. 27. No. 46, p. 498.

Nyasaland Protectorate. Sleeping Sickness Diary. Part 21. 11 pp. (Zomba: Printed by the Government Printer.)

Ogawa (M.). Sur un Trypanosome de *Triton pyrrhogaster*.—*Compt. Rend. Soc. Biol.*, 1913. Oct. 24. Vol. 75. No. 29, pp. 268–271. With 18 figs.

Paparcone (Ernesto). Ricerche Sperimentali sul Nagana. IV. Comunicazione. Lesioni oculari per Infezione generale da *Trypanosoma brucei*.—*Sperimentale*, 1913. Dec. 17. Vol. 67. No. 6, pp. 933–942.

Pringault (E.). Existence en France du *Trypanosoma vespertilionis* Battaglia.—*Compt. Rend. Soc. Biol.*, 1913. Dec. 26. Vol. 75. No. 37, pp. 663–665.

Ringenbach (J.). Sur un Cas de Maladie du Sommeil chez l'Européen, avec Phénomènes cutanés particuliers.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 628–631.

Rodhain (J.), Pons (C.), Vanden Branden (F.), and Bequaert (J.). Rapport sur les Travaux de la Mission Scientifique du Katanga (Octobre, 1910 à Septembre, 1912).—254 pp. With 2 coloured plates and 47 text figs., 1913. (Bruxelles: Hayez, Imprimeur de l'Académie Royal. Annexe: Carte du Katanga. Répartition des Glossines).

Sant'Ana (J. Firmino). A Tripanosomíase Humana da Rhodésia. Cronica e particularidades da Epidemia, no que Interessa ao Territorio Portuguès da Africa Oriental.—*Arquivos de Higiene e Patologia Exóticas*, 1913. Oct. 31. Vol. 4 pp. 3–50. With 1 map.

——. Observacoes sobre as Formas nao Flageladas do *Trypanosoma rhodesiense* nos Animais de Experiencia e em Especial no Rato.—*Arquivos de Higiene e Patologia Exóticas*, 1913. Oct. 31. Vol. 4, pp. 77–105. With 3 coloured plates.

SCHILLING (Claus). Beobachtungen über die Schlafkrankheit in Uganda.—*Deut. Med. Wochenschr*, 1913. Oct. 23. Vol. 39. No. 43, pp. 2094–2096. With 2 text figs.

—— & RONDONI (Pietro). Tossine tripanosomiche e Immunità di Fronte ai Tripanosomi.—*Sperimentale*, 1913. Nov. 13. Vol. 67. No. 5, pp. 595–613.

SHILSTON (A. W.). Notes on Zululand Trypanosomes.—*Union of S. Africa Dept. of Agriculture. Second Report of the Director of Veterinary Research* 1912. Oct. pp. 345–361. With 1 coloured and 1 black and white plate.

STOLOWSKY. Bericht über einen Versuch zur Ausrottung der *Glossina palpalis* durch Wegfangen.—*Arch. f. Schiffs- u. Trop.- Hyg.* 1913. Dec. Vol. 17. No. 24, pp. 856–860.

TODD (John L.). The Prevention of Human Trypanosomiasis in Africa.—*Trans. 15th International Congress on Hygiene and Demography, held at Washington, D.C., Sept.* 23–28, 1912, 8 pp.

——. Big Game and Sleeping Sickness versus Man and his Animals. (Correspondence).—*Lancet*, 1913. Nov. 22, p. 1504.

VAN DEN BRANDEN (F.). Note préliminaire sur quelques Essais de Traitement de la Trypanose Humaine par Salvarsankupfer.—*Arch. f. Schiffs- u. Trop.- Hyg.*, 1913. Dec. Vol. 17. No. 24, pp. 845-849.

VILLACA (Hermenegildo). Syndromo ovariano na molestia Carlos Chagas.—*Rev. Med. de S. Paulo*, 1913. May 15. Vol. 16. No. 9, pp. 163–168.

VRIJBURG (A.) Trypanosomen.—*Folia Microbiologica*, 1913. Apr. 7. Vol. 2. No. 1, pp. 79–94.

YORKE (Warrington). Big Game and Sleeping Sickness versus Man and his Animals. [Correspondence.]—*Lancet*, 1914. Jan. 3, pp. 72–73.

TYPHUS FEVER.

ARZT (L.) & KERL (W.). Ueber den Typhus exanthematicus. Beobachtungen im Seelazarett San Bartolomeo (Dir. Arzt. Seeoberarzt Dr. M. Kaiser) gelegentlich der Flecktyphusepidemie im Frühjahr 1913.—*Arch. f. Dermatol. u. Syphilis.* Orig., 1913. Sept. Vol. 118. No. 1, pp. 386–464. With 3 plates.

HEGLER (C.) & VON PROWAZEK (St.). Untersuchungen über Fleckfieber. Vorläufiger Bericht.—*Berlin klin. Wochenschr*, 1913. Nov. 3. Vol. 50. No. 44, pp. 2035–2036.

KULKE (Wilhelm). Der Flecktyphus und die gegenwärtigen Ergebnisse seiner Aetiologie und Epidemiologie.—*Das oesterreich. Sanitätswesen*, 1913. Nov. 6. Vol. 25. No. 45, pp. 1505–1512.

LÉVÊQUE. Note sur l'Endémie typhique de l'Aurès: "La Fièvre de Tkout": Typhus ou Paludisme? (Rapport des 9 Septembre, 1910, 28 Novembre 1910, 3 Février 1912, et 18 Mai 1913).—*Arch. de Méd. et de Pharm. Militaires*, 1913. Aug. Vol. 62. No. 7, pp. 203–204.

MARKL. Flecktyphus auf Schiffen.—*Arch. f. Schiffs- u. Trop.- Hyg.*, 1913. Dec. Vol. 17. No. 23, pp. 805–809.

NAUNYN (B.). Kritisches zur Lehre von den exanthematischen Typhus.—*Deut. Med. Wochenschr*, 1913. Dec. 4. Vol. 39. No. 49, pp. 2388–2391.

NEWMAN (Harold Hastings). A Sporadic Case of Typhus Fever.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 1. Vol. 61. No. 18, pp. 1629–1630.

RABINOWITSCH (Marcus). Ueber den Flecktyphuserreger.—*München. Med. Wochnschr.* 1913. Nov. 4. Vol. 60. No. 44, pp. 2451–2452.

——. Hämatologische Diagnose des Flecktyphus.—*Deut. Med. Woehenschr* 1913. Nov. 6. Vol. 39 No. 45 pp. 2199–2200.

UNDULANT FEVER.

BARTET & DEFRESSINE. Un Cas mortel de Fièvre Ondulante observé à Ajaccio (Cors).—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 601–605.

DELLA VIDA (Mario Levi). Alcune Osservazioni sopra una Epidemia di Febbre Mediterranea in un Comune della Provincia di Roma.—*Ann. d'Igiene Sperimentale*, 1913. Vol. 23 (New Ser.) No. 3, pp. 263–280. With 1 Map and 2 Figs.

GOLINI (Oreste). Una Epidemia di Febbre Mediterranea nella frazione di Montepescali (prov. Grosseto).—*Policlinico.* Sez. pratica, 1913. Nov. 2. Vol. 20. No. 44, pp. 1596–1600.

IZAR (Guido) Sulla Chemoterapia dell'Infezione Melitense.—*Pathologica*, 1913. Nov. 15. Vol. 5. No. 121, pp. 672–676.

MARSHALL (C. H.). Experiments with the *Micrococcus melitensis.—Jl. London School Trop. Med.*, 1913. Nov. Vol. 2. Part 3, pp. 220–223.

SALVATORE (Natale). Sul Valore da Assegnarsi alla Siero diagnosi nella Febbre Mediterranea.—*Policlinico.* Sez. practica, 1913. Dec. 21. Vol. 20. No. 51, pp. 1852–1856.

SÉJOURNANT (J.). La Fièvre Méditerranéenne en Algérie en 1912.—*Ann. Inst. Pasteur*, 1913. Oct. 25. Vol. 27. No. 10, pp. 828–838.

SUMMA. Zum Maltafieber in Südwestafrika.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1913. Dec. Vol. 17. No. 23, pp. 838–840.

WELLMAN (Creighton), EUSTIS (Allan), and SCHOCHET (S. S.). Malta Fever in Louisiana. Report of a Positive Case in a Series of Forty-six Agglutination Tests with Microbacillus melitensis.—*Amer. Jl. Trop. Diseases and Preventive Med.*, 1913. Nov. Vol. 1. No. 5, pp. 393–396.

YOUNT (C. E.). Malta Fever in the United States.—*Military Surgeon*, 1913. Dec. Vol. 33. No. 6, pp. 540–545.

[This is an historical review of reported cases of undulant fever occurring in Texas, New Mexico and Arizona, and contains little fresh information.]

YAWS.

BAETZ (W. G. F.). Report of a Case of Yaws treated with Salvarsan.—*Proc. Canal Zone Med. Assoc.* for the Half Year April to Sept., 1912. Vol. 5. Part 1, p. 81.

COCKIN (R. P.). Treatment of Yaws by Intramuscular Injections of Salvarsan. A Report on a Series of 45 Cases treated at the Yaws Hospital, St. George's, Grenada, B.W.I.—*Lancet*, 1913. Dec. 6., pp. 1609–1610.

DEGORCE (A.). Un Cas de Pian varioliforme.—*Bull. Soc. Méd. Chirurg. de l'Indo-Chine*, 1913. Oct. Vol. 4. No. 8, pp. 381–383. With 1 plate.

SCHMIDT (K.). Frambösie und Vakzine.—*Arch. f. Schiffs- u. Trop.-Hyg.* 1913. July. Vol. 17. No. 13, p. 460.

YELLOW FEVER.

JAMES (S. P.). The Protection of India from Yellow Fever.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 213–257. With 2 maps and 2 plans.

——. Note on the Practicability of Stegomyia reduction in Indian Seaports.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 258–262.

JOHNSTON (J. E. L.). The Pathology of Yellow Fever. [Correspondence *Lancet*, 1913.] Dec. 6, pp. 1660–1661.

MISCELLANEOUS.

AINHUM, POROCEPHALIASIS, RAT BITE DISEASE, SPRUE, VERRUGA PERUVIANA, VOMITING SICKNESS.

CANTLIE (James). Some Recent Observations on Sprue.—*Brit. Med. Jl.*, 1913. Nov. 15, pp. 1296–1297.

DICK (Mitchell Innes) & RUTHERFORD (W. J.). A Case of the so-called Rat-Bite Disease.—*Brit. Med. Jl.*, 1913. Dec. 20, pp. 1580–1581.

JUSTI (Karl). Beiträge zur Kenntnis der Sprue (Aphthae tropicae).—*Beiheft z. Arch. f. Schiffs- u. Trop.-Hyg.*, 1913. Dec. Vol. 17. Beiheft 10, pp. 5–53. [pp. 519–567.] With 1 plate.

MACFIE (J. W. Scott) & JOHNSTON (J. E. L.). A Note on Five Cases of Porocephaliasis in Man from Southern Nigeria.—*Lancet*, 1913. Nov. 15, pp. 1387–1389. With 1 text fig.

St. LEEDE (Carl). Ein Fall von Sprue durch Erdbeeren gebessert.—*Zeitschr. f. Hyg. u. Infektionskr.*, 1913. Oct. 8. Vol. 75. No. 3, pp. 578–586.

SEIDELIN (Harald). On "Vomiting Sickness" in Jamaica.—*Ann. Trop. Med. and Parasit.*, 1913. Nov. 7. Vol. 7. No. 3B, pp. 377–478. With 5 plates.

——. On "Vomiting Sickness" in Jamaica.—*Yellow Fever Bureau Bull.*, 1913. Nov. 19. Vol. 3. No. 1, pp. 7–108. With 5 plates. [Reprinted from *Ann. Trop. Med. and Parasit.* Vol. 7. No. 3 B.]

STRONG (Richard P.), TYZZER (E. E.), BRUES (Charles T.), SELLARDS (A. W.) & GASTIABURU (J. C.). Verruga Peruviana, Oroya Fever and Uta. Preliminary Report of the First Expedition to South America from the Department of Tropical Medicine of Harvard University.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 8. Vol. 61. No. 19, pp. 1713–1716.

SURVEYOR (N. F.). A Case of Rat-Bite Fever Treated with Neosalvarsan.—*Lancet*, 1913. Dec. 20, pp. 1764–1765.

TOWNSEND (Charles H. T.). The Transmission of Verruga by Phlebotomus.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 8. Vol. 61. No. 19, pp. 1717–1718.

WEINSTEIN (Henry). A Description of Ainhum as seen on the Canal Zone, with Report of Interesting Cases occurring in one Family.—*Southern Med. Jl.*, 1913. Oct. Vol. 6. No. 10, pp. 651–656. With 2 figs.

UNCLASSED.

ACTON (Hugh W.) & KNOWLES (R.). A New Method of obtaining a Viperine Antiserum. Preliminary Note.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 326–335.

ANDREWS (W. Horner). Experiments with Snakes.—*Union of S. Africa Dept. of Agriculture. Second Report of the Director of Veterinary Research*, 1912. Oct., pp. 406–483. With 4 plates.

BARBER (Marshall A.). An Unusual Disease prevailing in Epidemic Form at Buni, Ambos Camarines. P.I.—*Philippine Jl. of Science.* Sect. B. Trop. Med., 1913. Oct. Vol. 8. No. 5, pp. 369–372.

BARRATT (J. O. Wakelin). The Nature of the Coagulant of the Venom of *Echis carinatus*, a Small Indian Viper.—*Proc. Roy. Soc.*, 1913. Oct. 16. Vol. B 87. No. B 593, pp. 177–190.

BENJAMINS (C. E.). Over Naso-pharyngitis-mutilans.—*Geenesk. Tijdschr. v. Neder.-Indië.*, 1913. Vol. 53. No. 4, pp. 584–603. With 2 plates.

BOSTOCK (Leonard). Health and Sickness in the Tropics. x + 94 pp. London: Simpkin, Marshall, Hamilton, Kent & Co. [Price 2*s.* net.]

BOYD (R. Crawford). Case of Snake-Bite (Correspondence).—*Indian Med. Gaz.*, 1913. Dec. Vol. 48. No. 12, p. 490.

CARINI (A.). Encore sur l'Identité de l'Alastrim avec la Variole.—*Bull. Soc. Path. Exot.*, 1913. Oct. Vol. 6. No. 8, pp. 549–550.

CELLI (A.). Die Verbreitungsfähigkeit der pathogenen Keime.—*Arch. f. Hygiene*, 1913. Vol. 81. No. 7–8, pp. 333–371.

CHAGAS (Carlos). Notas Sobre a epidemiologia do Amazonas.—*Brazil Medico*, 1913. Nov. 8. Vol. 27. No. 42, pp. 450–456.

CHAMBERLAIN (Weston P.). Some Features of the Physiologic Activity of Americans in the Philippines.—*Amer. Jl. Trop. Diseases and Preventive Med.*, 1913. July. Vol. 1. No. 1, pp. 12–31.

CHARLES (Haveloch R.). Neurasthenia and its Bearing on the Decay of Northern Peoples in India.—*Trans. of the Soc. Trop. Med. and Hyg.*, 1913. Nov. Vol. 7. No. 1, pp. 2–15. (With Discussion, pp. 15–31).

DANIELS (C. W.). Tropical Medicine and Hygiene. In Three Parts. Part 1. Diseases due to Protozoa. Second Edition. xv + 277 pp. With 2 coloured plates, and 73 text figures. 1913. London: John Bale, Sons & Danielsson. [Price 7*s.* 6*d.* net.]

DAY (E. C.). Report of an Instructive Case of Snake-Bite.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 8. Vol. 61. No. 19, p. 1718.

EAST AFRICA PROTECTORATE. Nairobi Laboratory Reports for half-year, January-June, 1912. Vol. 3. Part 1. By R. SMALL. [Acting Govt. Bacteriologist] & V. H. KIRKHAM.—73 pp. 4to, 1913. Printed by Waterlow & Sons, Ltd., London.

——. Nairobi Laboratory Report for the months July-December, 1912. Vol. 3. Part 2. By Philip H. Ross [Govt. Bacteriologist] & V. H. KIRKHAM, Govt. Analyst — v. — 72 pp. 4to.

FEDERATED MALAY STATES. Twelfth Annual Report of the Institute for Medical Research, Kuala Lampur, Federated Malay States, 1912. 71 pp., 1913. Kuala Lampur: Printed at the F. M. S. Government Printing Office. [Beri-beri, pp. 5–16. Leprosy, pp. 16–26. Plague, pp. 27–46. Blackwater Fever, pp. 47–51. Malaria, pp. 51–64.]

FÜLLEBORN (Friedrich). Ueber eine medizinische Studienreise nach Panama, Westindien und den Vereinigten Staaten.—*Beiheft z. Arch. f. Schiffs- u. Trop. Hyg.*, 1913. Oct. Vol. 17. Beiheft 7. pp. 5–65. (pp. 395–455). With 8 plates.

FUNK (Casimir). Diät und diätetische Behandlung vom Standpunkt der Vitaminlehre.—*München. Med. Wochenschr.*, 1913. Nov. 25. Vol. 60. No. 47. pp. 2614–2616.

GUIETERAS (Juan). The White Race and the Tropics.—*Amer. Jl. Trop. Diseases & Preventive Med.*, 1913. Aug. Vol. 1. No. 2, pp. 159–168.

HEHIR (P.). Disease "Carriers" in our Army in India.—*Indian Med. Gaz.*, 1913. Dec. Vol. 48. No. 12, pp. 467–472.

HOLMES (J. D. E.). A Description of the Imperial Bacteriological Laboratory, Muktesar: its Work and Products.—47 pp. With illustrations, 1913. (Calcutta: Superintendent Government Printing, India.)

HOPKINS (F. Gowland). Diseases due to Deficiencies in Diet.—*Lancet*. Nov. 8, pp. 1309–1310.

JACKSON (R. W. H.). A Case of Snake-Bite.—*Jl. R. Army Med. Corps*, 1913. Dec. Vol. 21. No. 6, pp. 694–695. With 1 fig.

JOYEUX (C.). Contribution à l'Etude des Nodosités juxta-articulaires.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 711–714.

KOPP (Karl). Zur Frage des Bevölkerungsrückganges in Neupommern.—*Arch. f. Schiffs.- u. Trop. Hyg.*, 1913. Nov. Vol. 17. No. 21, pp. 729–750. With 1 text fig.

KÜLZ (L.). Beiträge zur Pathologie Kameruns. (Eingegangen August, 1913). *Arch. f. Schiffs- u. Trop. Hyg.* 1913. Dec. Vol. 17. No. 23, pp. 830–834. With 2 figs.

Kulz (L.). Anfrage über die essbaren Erden Ostafrikas.—*Arch. f. Schiffs- u. Trop Hyg.*, 1913. Dec. Vol. 17. No. 23, p. 844.

Law (William F.). Discussion on the Causes of Invaliding from the Tropics. Opening Paper. III.—*Brit. Med. Jl.*, 1913. Nov. 15, pp. 1294–1295.

Macphail (J. M.). Health in the Tropics.—*Medical Missions in India*, 1913. Oct. Vol. 19. No. 75, pp. 134–143.

Maxwell (James L.). Some Diseases the Parasitic Causes of which are Obscure.—*China Med. Jl.*, 1913. Sept. Vol. 27. No. 5, pp. 279–285.

Mayer (Martin). Tropenmedizin.—*Jahreskurse für ärztliche Fortbildung*, 1913. Oct., pp. 57–65.

Mense (Carl). Handbuch der Tropenkrankheiten. Vol. I. Part 2. xiii + 295 pp. With 2 plates and 200 text figs., 1913. Leipzig: J. A. Barth.

Otis (Elmer F.). Experiences of a Health Officer in Porto Rico.—*Jl. Amer. Med. Assoc.*, 1913. Nov. 8. Vol. 61. No. 19, pp. 1683–1684.

Potter (T. J.). Report on Peripheral Neuritis. With Comments by District Medical Officers, 1913. 8 pp. (Jamaica: Govt. Printing Office, Kingston.)

Price (G. Basil). Discussion on the Causes of Invaliding from the Tropics. Opening Paper. I.—*Brit. Med. Jl.*, 1913. Nov. 15, pp. 1290–1293.

Ravenhill (T. H.). Some Experiences of Mountain Sickness in the Andes.—*Jl. Trop. Med. & Hyg.*, 1913. Oct. 15. Vol. 16. No. 20, pp. 313–320. With a chart.

Reinhold (C. H.). Case of Snake-Bite. (Correspondence).—*Indian Med. Gaz.*, 1913. Oct. Vol. 48. No. 10, p. 413.

Remlinger (P.). La Fièvre de Tanger ou Tangérine n'est pas une Entité morbide.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 599–601.

Richaud (A.). Les Parasiticides. Leçons professées à la Faculté de Médecine de Paris.—*Arch. de Parasitologie*, 1913. Apr. 15. Vol. 16. No. 1, pp. 5–133.

Ross (G. A. Park). A Fictitious Native Disease (Isigwebedhla).—*Ann. Trop. Med. & Parasitology*, 1913. Nov. 7. Ser. T. M. Vol. 7. No. 3 B, pp. 371–376.

Rubino (C.) & Farmachidis (C. B.). L'Azione ostacolante ed Attivante del Veleno di Cobra nelle Reazioni Emolitiche con Sieri di Neoplastici.—*Riforma Medica*, 1913. Dec. 6. Vol. 29. No. 49, pp. 1345–1349.

Sacquépée (E.). Les Infections paratyphoïdes dans l'Afrique du Nord.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 598–599.

Santamaria (J. M.). Some Notes on Tropical Diseases observed in the Republic of Colombia.—*Jl. Trop. Med. & Hyg.*, 1913. Apr. 1. Vol. 16. No. 7, pp. 100–102.

Schilling-Torgau (V.). Technik des Blutausstriches und eine neue Differential-Zähltafel für Leukozyten.—*Deut. Med. Wochenschr.*, 1913. Oct. 9. Vol. 39. No. 41, pp. 1985–1987.

Shircore (J. O.) & Ross (P. H.). Epidemic Cerebro-Spinal Meningitis in Nairobi, British East Africa.—*Trans. Soc. Trop. Med. & Hyg.*, 1913. Dec. Vol. 7. No. 2, pp. 83–95. With 1 plate.

Simpson (R. J. S.). Discussion on the causes of Invaliding from the Tropics. Opening Paper. II.—*Brit. Med. Jl.*, 1913. Nov. 15. pp. 1293–1294.

Sorel (F.). L'Hygiène à Bassam en 1912.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9 pp. 645–653. With 3 maps.

STEVENSON (W. D. H.). The Preparation of an Antivenomous Serum for the *Echis carinata*, or Phoorsa, with Notes on the Toxicity and Haemolysing Power of the Venom.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 311–325.

WALL (F.). The Poisonous Terrestrial Snakes of our British Indian Dominions (including Ceylon) and how to Recognize them. With Symptoms of Snake Poisoning and Treatment. x-149-iv. pp. With 42 text figs. Third Edition, 1913. (Bombay: Published by the Bombay Natural History Society.) [Price 3 Rupees.]

——. Treatment of Snake Poisoning.—*Indian Med. Gaz.*, 1913. Nov. Vol. 48. No. 11, pp. 428–430.

WHITE (P. Carr). A Case of Cobra Poisoning: Recovery.—*Indian Med. Gaz.*, 1913. Nov. Vol. 48. No. 11, pp. 430–431.

WILLFÜHR (G.). Ueber die Bedeutung der Bazillenträger für die Verbreitung übertragbarer Krankheiten.—*Vierteljahrsschr. f. gerichtliche Med. u. öffentlich. Sanitätswesen.* (3. Folge. Vol. 46. No. 1), 1913. No. 3, pp. 142–173.

ZIEMANN (H.). Zur Therapie der Menstruations-beschwerden der Frauen in den Tropen.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1913. July. Vol. 17. No. 13, p. 459.

——. Gesundheits-Ratgeber für die Tropen. 63 pp. With 16 text figs., 1913. Berlin: Dietrich Reimer (Ernst Vohsen).

de ZWAAN (J. P. Kleiweg). Die Heilkunde der Niasser.—*Janus.*, 1913. Sept. Vol. 18. No. 9, pp. 454–461.

Biting Arthropods and Ticks.

ADAM (G.) The Jigger, and its Occurrence in Mine Dust.—*Transvaal Med. Jl.*, 1912. Sept. Vol. 8. No. 2, p. 43.

BEDFORD (G. A. H.). A Tick new to South Africa.—*Union of S. Africa Dept. of Agriculture. Second Report of the Director of Veterinary Research*, 1912. Oct., pp. 343–344. With 1 plate.

BRETON & BRUYANT (L.). Mouches non Piqueuses et Maladies.—*Bull. Office Intern. d'Hyg. Publique*, 1913. Oct. Vol. 5. No. 10, pp. 1759–1802.

BRUMPT (E.). Utilisation des Insectes auxiliares entomophages dans la Lutte contre les Insectes pathogènes.—*Rev. Med. de S. Paulo*, 1913. Feb. 28. Vol. 16. No. 4, pp. 72–76.

CRAGG (F. W.). Studies on the Mouth Parts and Sucking Apparatus of the Blood-Sucking Diptera. No. 4. The Comparative Anatomy of the Proboscis in the Blood-Sucking Muscidae.—*Scientific Memoirs by Officers of the Med. & San. Departs. Govern. India*, 1913. (New Series.) No. 60, 56 pp. With 5 plates. (Calcutta: Superintendent Government Printing, India.)

CARTER (Henry F.) On Certain Mosquitos of the Genera *Banksinella*, Theobald, and *Taeniorhynchus*, Arribalzaga.—*Ann. Trop. Med. & Parasit.* 1913. Dec. 30. Vol. 7. No. 4. pp. 581–589. With 7 figs.

DRAKE-BROCKMAN (R. E.). Some Notes on *Stegomyia Fasciata* in the Coast Towns of British Somaliland.—*Jl. London School of Trop. Med.*, 1913. Nov. Vol. 2. Part 3. pp. 166–169.

EYSELL (Adolf). Verbesserte feuchte Kammer zur Stechmückenzucht.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1913. Oct. Vol. 17. No. 20, pp. 712–714. With 1 text fig.

GÖLDI (Emil A.). Die sanitarisch-pathologische Bedeutung der Insekten und verwandten Gliedertiere namentlich als Krankheits-Erreger und Krankheits-Ueberträger. 155 pp. With 178 figs., 1913. (Berlin: R. Friedländer & Sohn.) [Price 9s.]

GRAHAM (J. D.). Note on Mosquito Larvae-Destroying Fish in the United Provinces.—6 pp. folio. (Printed by F. Luker, Supt. Govt. Press).

GRAHAM-SMITH (G. S.). Flies in Relation to Disease. Non-Blood-sucking Flies. xiv. + 292 pp. Demy 8vo. With 24 plates and 32 texr figs., 1913. (Cambridge: University Press.) [Price 10*s.* 6*d.* net.]

HADWEN (Seymour). On "Tick Paralysis" in Sheep and Man, following Bites of *Dermacentor venustus*.—*Parasitology*, 1913. Oct. Vol. 6. No. 3, pp. 283–297. With 2 plates.

—— & NUTTALL (G. H. F.). Experimental "Tick Paralysis" in the Dog.—*Parasitology*, 1913. Oct. Vol. 6. No. 3, pp. 298–301.

HOWLETT (F. M.) Insect Life-Histories and Parasitism. Part 1.—*Indian Jl. Med. Research*, 1913. July. Vol. 1. No. 1, pp. 39–43.

KING (W. V.). Note on the Mounting of Mosquito Larvae.—*Amer. Jl. Trop. Diseases & Preventive Med.*, 1913. Nov. Vol. 1. No. 5, p. 403.

LANE (Clayton). "Bounding Bed-bugs." [Correspondence.]—*Indian Med. Gaz.*, 1913. July. Vol. 48. No. 7, pp. 286–287.

LUTZ (Adolph). Tabaniden Brasiliens und einiger Nachbarstaaten.—*Memorias do Instituto Oswaldo Cruz.*, 1913. Vol. 5. No. 2, pp. 142–191. With 2 coloured plates.

——. Sobre a Systematica dos Tabanideos Sub-familia Tabanidae.—*Brazil Medico*, 1913. Dec. 1. Vol. 27. No. 45, pp. 486–487.

MITZMAIN (M. Bruin). The Biology of *Tabanus striatus* Fabricus, the Horse-fly of the Philippines.—*Philippine Jl. of Science*, Sect. B., Trop. Med., 1913. June. Vol. 8. No. 3, pp. 197–221. With 7 plates.

NÖLLER (Wilhelm). Die blutsaugenden Insekten als Krankheitsüberträger.—*Monatshefte f. prak. Tierheilkunde.* Vol. 25. No. 1–2, pp. 68–90. With 5 text figs.

ORENSTEIN (A.). Ueber Rohkarbolsäure als Mückenvertilgungsmittel.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1913. Dec. Vol. 17. No. 23, pp. 837–838.

PATTON (W. S.) & CRAGG (F. W.). On Certain Haematophagous Species of the Genus *Musca*, with Descriptions of Two New Species.—*Indian Jl. Med. Research.* 1913. July. Vol. 1. No. 1, pp. 11–25. With 5 plates.

ROBINSON (L. E.) & DAVIDSON (J.). The Anatomy of *Argas persicus* (Oken, 1818). Part 2.—*Parasitology*, 1913. Oct. Vol. 6. No. 3, pp. 217–256. With 4 plates and 8 text figs.

STRICKLAND (E. Harold). Further Observations on the Parasites of Simulium larvae.—*Jl. of Morphology*, 1913. March 20. Vol. 24. No. 1, pp. 43–105. With 6 plates.

THEOBALD (Fred V.). Second Report on the Mosquitos of the Transvaal.—*Union of S. Africa Dept. of Agriculture. Second Report of the Director of Veterinary Research*, 1912. Oct., pp. 315–342. With 3 plates.

——. New Culicidae from the Sudan.—*Ann. Trop. Med. & Parasit.*, 1913. Dec. 30. Vol. 7. No. 4, pp. 591–602. With 2 text figs.

WELLMAN (Creighton) & KING (Howard D.). A List of the Mosquitos hitherto Reported from New Orleans.—*Amer. Jl. Trop. Dis. & Preventive Med.*, 1913. Oct. Vol. 1. No. 4, pp. 267–280.

Protozoology (excluding Trypanosomes, Leishmania, and Amoebae.)

da CUNHA (Aristides Marques). Beitraege zur Kenntnis der Protozoenfauna Brasiliens.—*Memorias do Instituto Oswaldo Cruz*, 1913. Vol. 5. No. 2, pp. 101–122. With 2 plates.

FANTHAM (H. B.) & PORTER (Annie). The Pathogenicity of *Nosema apis* to Insects other than Hive Bees.—*Ann. Trop. Med. & Parasit.*, 1913. Dec. 30. Vol. 7. No. 4, pp. 569–579.

—— & ——. *Herpetomonas stratiomyiae*, n. sp., a Flagellate Parasite of the Flies, *Stratiomyia chameleon* and *S. potamida*, with Remarks on the Biology of the Hosts.—*Ann. Trop. Med. & Parasit.*, 1913. Dec. 30. Vol. 7. No. 4, pp. 609–620. With 1 plate.

GELEI (J.). Bau, Teilung und Infektionsverhältnisse von *Trypanoplasma dendrocoeli*, Fantham.—*Arch. f. Protistenkunde*, 1913. Nov. 11. Vol. 32. No. 1, With 1 plate and 1 text fig.

HENRY (Herbert). The Granule Shedding of *Haemogregarina simondi*.—*Jl. Pathology & Bacteriology*, 1913. Oct. Vol. 18. No. 2, pp. 240–249. With 3 plates.

——. A Consideration of the Infective Granule in the Life History of Protist Organisms.—*Jl. Pathology & Bacteriology*, 1913. Oct. Vol. 18. No. 2, pp. 250–258.

JOYEUX (C.). Note sur quelques Protozoaires sanguicoles et intestinaux observés en Guinée française.—*Bull. Soc. Path. Exot.*, 1913. Nov. Vol. 6. No. 9, pp. 612–615.

LAVERAN (A.) & FRANCHINI (G.). Infections expérimentales de Mammifères par des Flagellés du Tube digestif de *Ctenocephalus canis* et d'*Anopheles maculipennis*.—*Compt. Rend. Acad. Sci.*, 1913. Nov. 3. Vol. 157. No. 18, pp. 744–747.

——. & ——. Infezione Sperimentale del Topo Bianco coll'*Herpetomonas ctenocephali*.—*Pathologica*, 1913. Oct. 15. Vol. 5. No. 119, pp. 605–607.

LEWIN (Kenneth R.). The Nuclear Structure and the Sporulation of *Agrippina bona*, Strickland.—*Parasitology*, 1913. Oct. Vol 6. No. 3, pp. 257–264. With 1 plate and 8 text figs.

MIYAJI (S.). Zur Frage nach der Natur der Kurloffschen Körperchen.—*Centralbl. f. Bakt.* 1. Abt., Orig., 1913. Oct. Vol. 71. No. 2–3, pp. 189–198. With 2 coloured plates.

NOLLER (Wilhelm). Die Blutprotozoen des Wasserfrosches und ihre Uebertragung. Part 1.—*Arch. f. Protistenkunde*, 1913. Oct. 10. Vol. 31. No. 2, pp. 169–240. With 3 plates and 5 text figs.

O'FARRELL (W. R.). Hereditary Infection, with Special Reference to its Occurrence in *Hyalomma aegyptium* infected with *Crithidia hyalommea*.—*Ann. Trop. Med. & Parasit.*, 1913. Dec. 30. Vol. 7. No. 4, pp. 545–562. With 3 plates.

PAPPENHEIM (A.) Ueber neuere Feststellungen zur Natur der sog. Kurloffkörper in den grossen Lymphozyten des Meerschweinchenblutes.—*Folia Haematologica*, 1913. Dec. Vol. 17. No. 2, pp. 183–190.

PIXELL (Helen L. M.). Notes on *Toxoplasma gondii*.—*Proc. Roy. Soc.*, 1913. Oct. 1. Vol. B 87. No. B 592, pp. 67–77. With 1 plate.

v. PROWAZEK (S.). Notiz zur *Herpetomonas*-Morphologie sowie Bemerkung zu der Arbeit von Wenyon.—*Arch. f. Protistenkunde*, 1913 Sept. 25. Vol. 31. No. 1, pp. 37–38.

——. Studien zur Biologie der Protozoen. VI.—*Arch f. Protistenkunde*, 1913. Sept. 25. Vol. 31. No. 1, pp. 47–71. With 1 plate and 7 text figs.

von RÁTZ (Stephan). Trichomonas aus der Leber der Tauben.—*Centralbl. f. Bakt.* 1. Abt., Orig., 1913. Oct. Vol. 71. No. 2–3, pp. 184–189.

SCHULHOF (Kamil). Studien über die Kurloffkörper nebst Beiträgen zur vergleichenden Hämatologie.—*Folia Haematologica*, 1913. Dec. Vol. 17. No. 2, pp. 191–210.

VISENTINI (Arrigo). Gli Emoparassiti della Talpa in Italia (Nota preventiva.)—*Arch. f. Protistenkunde*, 1913. Dec. 11. Vol. 32. No. 2, pp. 257–266. With 1 coloured plate.

WALKER (J.). A Short Note on the Occurrence of a Leucocytozoon Infection. Host, the Ostrich.—*Union of S. Africa Dept. of Agriculture. Second Report of the Director of Veterinary Research*, 1912. Oct., pp. 384–386. With 1 plate.

WENYON (C. M.). Observations on *Herpetomonas muscae domesticae* and some Allied Flagellates.—*Arch. f. Protistenkunde*, 1913. Sept 25. Vol. 31. No. 1, pp. 1–36. With 3 plates, 6 text figs., and 1 diagram.

See also **Amoebiasis, Kala Azar** and **Sleeping Sickness.**

May 15, 1914.]

LIST OF REFERENCES.

Compiled by R. L. SHEPPARD, Librarian of the Bureau.

[Continued from BULLETIN, Vol. 3, pp. vii-xxxviii.]

For the benefit of recipients of the Bulletin who wish to make a **Card Catalogue,** or to preserve a consecutive record of the references on any subject the Director is willing to supply **galley proofs** ['*Korrekturbogen.*'; '*Première.*'] of the **Quarterly Lists of References** (printed on one side of the page) at the subscription price of **Two Shillings per annum.** Application should be made direct to the Bureau.

AMOEBIASIS (including Entamoebic Dysentery and Liver Abscess.)

ALLAIN (J.). Emploi du Chlorhydrate d'Emétine dans les Amibiases par les Médecins du Corps de Santé des Troupes Coloniales.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 723–730.

ALLAN (William). Progress Report in the Use of Emetine in Amebic Dysentery.—*Amer. Jl. Trop. Diseases & Prevent. Med.*, 1914. Feb. Vol. 1. No. 8, pp. 565–572.

ALOY (Alberto Correa). Del Clorhidrato de Emetina en el Tratamiento de la Disenteria por las Amibas.—*Revista Med. de Yucatan*, 1913. Dec. Vol. 9. No. 2, pp. 25–27.

ANNALES D'HYGIÈNE ET DE MÈDECINE COLONIALES. 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 236–240. Hôpital de Hanoï. Le Chlorhydrate d'Emétine dans les Hépatites suppurées. [Clinique d'Outre-Mer.]

BEHREND (Kurt). Kurze Angaben über eine nichtpathogene Amöbe aus dem Darm von *Macacus rhesus.*—*Arch. f. Protistenkunde*, 1914. Mar. 28. Vol. 34. No. 1, pp. 35–38. With 8 text figs.

BELL (J.). Note of a Case of Liver Abscess treated without Operation.—*Jl. Trop. Med. & Hyg.*, 1914. Feb. 2. Vol. 17. No. 3, p. 33.

BROOKE (Roger). The General Action of Quinin in the Treatment of Amebic Dysentery.—*Jl. Amer. Med. Assoc.*, 1914. Mar. 28. Vol. 62. No. 13, pp. 1009–1010.

CARTER (R. Markham). Emetine and Ipecacuanha; Their Amoebacidal Value in Pathogenic Amoebiasis.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 109–112.

CHATERJI (K. K.). Emetine in Hepatitis, and Amoebic Abscesses of the Liver and Spleen.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 108–109.

CHAUFFARD. Les Rechutes de la Dysenterie Amibienne et leur Traitement.—*Jl. des Praticiens*, 1914. Jan. 17. Vol. 28. No. 3, pp. 39–40.

——. Etat hémoptoïque chronique, Consécutif a l'Ouverture dans les Bronches d'un Abcès dysentérique du Foie. Guérison par l'Emétine.—*Bulls et Mémes. Soc. Méd. des Hôpit. de Paris*, 1914. Jan. 22. 3e Ser. 30e Ann. No. 2, pp. 29–34.

DARLING (S. T.). Observations on Amoebae and Entamoebae in Panama.—*Proc. Canal Zone Med. Assoc. Isthmian Canal Commission for the Half Year, Oct. 1911 to March 1912.* Vol. 4. Pt. 2, pp. 122–131.

DOPTER (Ch.). Amibiase et Emétine.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 142–152.

May 15, 1914.]

LIST OF REFERENCES.

Compiled by R. L. SHEPPARD, Librarian of the Bureau.

[Continued from BULLETIN, Vol. 3, pp. vii-xxxviii.]

For the benefit of recipients of the Bulletin who wish to make a **Card Catalogue,** or to preserve a consecutive record of the references on any subject the Director is willing to supply **galley proofs** ['*Korrekturbogen.*'; '*Première.*'] of the **Quarterly Lists of References** (printed on one side of the page) at the subscription price of **Two Shillings per annum.** Application should be made direct to the Bureau.

AMOEBIASIS (including Entamoebic Dysentery and Liver Abscess.)

ALLAIN (J.). Emploi du Chlorhydrate d'Emétine dans les Amibiases par les Médecins du Corps de Santé des Troupes Coloniales.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 723–730.

ALLAN (William). Progress Report in the Use of Emetine in Amebic Dysentery.—*Amer. Jl. Trop. Diseases & Prevent. Med.*, 1914. Feb. Vol. 1. No. 8, pp. 565–572.

ALOY (Alberto Correa). Del Clorhidrato de Emetina en el Tratamiento de la Disenteria por las Amibas.—*Revista Med. de Yucatan*, 1913. Dec. Vol. 9. No. 2, pp. 25–27.

ANNALES D'HYGIÈNE ET DE MÈDECINE COLONIALES. 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 236–240. Hôpital de Hanoï. Le Chlorhydrate d'Emétine dans les Hépatites suppurées. [Clinique d'Outre-Mer.]

BEHREND (Kurt). Kurze Angaben über eine nichtpathogene Amöbe aus dem Darm von *Macacus rhesus.*—*Arch. f. Protistenkunde*, 1914. Mar. 28. Vol. 34. No. 1, pp. 35–38. With 8 text figs.

BELL (J.). Note of a Case of Liver Abscess treated without Operation.—*Jl. Trop. Med. & Hyg.*, 1914. Feb. 2. Vol. 17. No. 3, p. 33.

BROOKE (Roger). The General Action of Quinin in the Treatment of Amebic Dysentery.—*Jl. Amer. Med. Assoc.*, 1914. Mar. 28. Vol. 62. No. 13, pp. 1009–1010.

CARTER (R. Markham). Emetine and Ipecacuanha; Their Amoebacidal Value in Pathogenic Amoebiasis.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 109–112.

CHATERJI (K. K.). Emetine in Hepatitis, and Amoebic Abscesses of the Liver and Spleen.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 108–109.

CHAUFFARD. Les Rechutes de la Dysenterie Amibienne et leur Traitement.—*Jl. des Praticiens*, 1914. Jan. 17. Vol. 28. No. 3, pp. 39–40.

——. Etat hémoptoïque chronique, Consécutif a l'Ouverture dans les Bronches d'un Abcès dysentérique du Foie. Guérison par l'Emétine.—*Bulls et Mém. Soc. Méd. des Hôpit. de Paris*, 1914. Jan. 22. 3e Ser. 30e Ann. No. 2, pp. 29–34.

DARLING (S. T.). Observations on Amoebae and Entamoebae in Panama —*Proc. Canal Zone Med. Assoc. Isthmian Canal Commission for the Half Year, Oct. 1911 to March 1912.* Vol. 4. Pt. 2, pp. 122–131.

DOPTER (Ch.). Amibiase et Emétine.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 142–152.

NOTT (A. H.). Emetine and Liver Abscess.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 101–103.

PEPIN (Jules). Deux Cas de Dysenterie amibienne traités et guéris par l'Emétine.—*Bull. Soc. Méd. de l'Ile Maurice*, 1913. Oct.–Nov.–Dec. Vol. 3. 2me série. No. 34, pp. 63–64.

ROGERS (Leonard). The Emetine and other Treatment of Amoebic Dysentery and Hepatitis including Liver Abscess.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 85–88.

ROSIER (Cl.). Un Cas d'Abcès du Foie postdysentérique. Opération et Traitement au Chlorhydrate d'Emétine.—*Presse Méd. Belge*, 1914. Feb. 1. Vol. 66. No. 5, pp. 75–78.

SAMBUC (E.). Pleurésies purulentes tardives au Cours de l'Abcès du Foie.—*Bull. Soc. Méd.-Chirurg. de l'Indochine*, 1913. Dec. Vol. 4. No. 10, pp. 451–466. With 2 charts and 1 plate.

——. & ROUVIER (A.). Abcès pré-coecal d'Origine dysentérique, simulant une Appendicite suppurée.—*Bull. Soc. Med.-Chirurg. de l' Indochine*, 1914. Jan. Vol. 5. No. 1, pp. 15–17.

[The authors report a fatal case of pericoecal abscess. The appendix was found quite normal. Full post-mortem notes are given.]

SANDES (John D.). Treatment of Liver Abscess.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 107–108.

SEAL (C. Baldwin). Note on Amoebic Dysentery in the Darjeeling District and its Treatment.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 106–107.

THURSTON (E. Owen). A Series of 101 Cases of Abscess of the Liver.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 88–96.

UJIHARA (K.). Studien über die Amöbendysenterie. (I. Mitteilung.)—*Zeitschr. f. Hyg. u. Infektionskr.*, 1914. Apr. 1. Vol. 77. No. 2, pp. 329–355. With 1 plate.

VEDDER (Edward B.). Origin and Present Status of the Emetin Treatment of Amebic Dysentery.—*Jl. Amer. Med. Assoc.*, 1914. Feb. 14. Vol. 62. No. 7, pp. 501–506.

WAGNER (Jerome). Report of Cases of Amebic Dysentery treated with Emetine.—*Med. Record*, 1914. Jan. 31. Vol. 85. No. 5, pp. 190–194.

WEBB (Vere G.). Amoebic Dysentery ?—*Lancet*, 1914. Jan. 3, pp. 74–75.

WERNER (H.). Emetin bei Amöbendysenterie.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 6, pp. 206–210.

WHEELER (George W.). Amebic Dysentery. Report of a Case apparently Cured with Neosalvarsan.—*U. S. Public Health Rep.*, 1914. Mar. 13. Vol. 29. No. 11, pp. 627–629.

WHITMORE (A.). An Experience in the Use of Emetine in the Treatment of Amoebic Dysentery.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 112–116.

YEOMANS (Frank C.). Amebic Dysentery. With Special Reference to its Treatment with Emetine.—*New York Med. Jl.*, 1914. Feb. 14. Vol. 99. No. 7 [Whole No. 1837], pp. 327–331.

See also **Dysentery (unclassed).**

BERIBERI.

ARNOLD (W. J. J.). The Etiology of Beri-Beri.—*Brit. Med. Jl.*, 1914. Feb. 7, pp. 299–300.

BRADDON (Leonard W.). On Some of the Results of Measures taken against Beri-beri in British Malaya.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 91–112.

CHAMBERLAIN (Weston P.). The Etiology of Oriental Beri-Beri. Character of the Rice which causes Polyneuritis in Man and Fowls.—*New York Med. Jl.*, 1914. Feb. 7. Vol. 99. No. 6 [Whole No. 1836], pp. 263–269. With 6 text figs. and 1 chart.

[A general review of the etiology and spread of beriberi, delivered as a lecture in November 1913. It contains no new facts.]

CLARKE (J. Tertius). The Etiology of Beri-Beri. [Correspondence.]—*Brit. Med. Jl.*, 1914. Jan. 10, pp. 113–114.

FRASER (Henry) & STANTON (A. T.). Unpolished Rice and the Prevention of Beri-Beri.—*Lancet*, 1914. Jan. 10, pp. 96–98. With 1 text fig.

FUNK (Casimir). Studies on Beri-Beri. The Probable Role of Vitamines in the Process of Digestion and Utilisation of Food.—*Jl. of Physiology*, 1914. Feb. 27. Vol. 47. No. 6 (Proceedings of the Physiological Society, Dec. 13, 1913), pp. xxv–xxvi.

——. Studien über Beri-Beri. x. Mitteilung. Experimentelle Beweise gegen die toxische Theorie bei Beri-Beri.—*Hoppe-Seyler's Zeitschr. f. physiol. Chemie*, 1914. Feb. 28. Vol. 89. No. 5, pp. 373–377.

——. Studien über Beri-Beri. xi. Mitteilung. Die Rolle der Vitamine beim Kohlenhydrat-Stoffwechsel.—*Hoppe-Seyler's Zeitschr. f. physiol. Chemie*, 1914. Feb. 28. Vol. 89. No. 5, pp. 378–380.

—— & DOUGLAS (Mackenzie). Studies on Beri-Beri. viii. The Relationship of Beri-Beri to Glands of Internal Secretion.—*Jl. of Physiology*, 1914. Feb. 27. Vol. 47. No. 6, pp. 475–478.

GALT (W. J.). The Etiology of Beri-Beri. [Correspondence.]—*Brit. Med. Jl.*, 1914. Feb. 28, pp. 512–513.

GIBSON (R. B.). The Influence of Compensated Salt Mixtures on the Development of Polyneuritis gallinarum and Beri-Beri.—*Philippine Jl. of Science.* Sect. B. Trop. Med., 1913. Oct. Vol. 8. No. 5, pp. 351–367. With 4 plates.

GRIJNS (G.). Eenige Opmerkingen over Beri-Beri en over Polyneuritis bij Hoenders.—*Geneeskund. Tijdschr. v. Nederl.-Indië*, 1914. Vol. 54. No. 1, pp. 1–7.

HEISER (Victor G.). Beri-Beri. An Additional Experience at Culion. How can a Knowledge as to its Prevention best be Applied from the Standpoint of State Medicine?—*Med. Record*, 1914. Jan. 31. Vol. 85. No. 5, pp. 186–188.

KERNÉIS. Pian, Likoutombo (Fièvre éruptive spéciale), Béri-Béri au Moyen Congo. Extrait du Rapport annuel de 1912. (Clinique d'Outre-Mer.)—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 229–233.

PARKER (Herman B.). A Report on Beri-Beri in the County Jail at Elizabeth, N.J.—*U. S. Public Health Rep.*, 1914. Feb. 6. Vol. 29. No. 6, pp. 339–341.

PRIEST (R. C.). Some Observations upon Thirty-One Cases of Multiple Peripheral Neuritis amongst European Troops in India.—*Jl. R. Army Med. Corps*, 1914. Feb. Vol. 22. No. 2, pp. 173–185. With a sketch plan.

RICHTER (Hugo). Zentrale Veränderungen bei experimenteller Beri-Beri der Taube.—*Zeitschr. f. d. gesamte Neurolog. u. Psychiat.* Orig. 1913. Dec. 23. Vol. 21. No. 1–2, pp. 172–181. With 1 text fig. and 2 figs. on a plate.

SCHAUMANN (H.). Bemerkungen zu der Veröffentlichung von Casimir Funk: "Ueber die physiologische Bedeutung gewisser unbekannter Nahrungsbestandteile der Vitamine."—*Arch. f. Schiffs-u. Trop.-Hyg.*, 1914. Feb. Vol. 18. No. 4, pp. 125–131.

SHIBAYAMA (S.). The Present State of the Study of Beri-Beri in Japan.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 87–90.

VEDDER (Edward B.). Beri-Beri.—viii + 427 pp. With 5 coloured plates and numerous engravings. 1913. London: John Bale, Sons & Danielsson, Ltd. [18s. net.].

VOLPINO (G.). Il Monofagismo ed i Suoi Rapporti con le Malattie popolari della Pellagra, dello Scorbuto e del Beri-Beri.—*Rivista Pellagrologica Italiana*, 1914. Mar. Vol. 14. No. 2, pp. 17–18.

BLACKWATER FEVER.

AFRICA. Blackwater Fever in the Tropical African Dependencies. Reports for 1912.—65 pp. With 6 maps. 1914. London: H. M. Stationery Office. [Cd. 7211.] Price 3*s.* 1*d.*

BARRATT (J. O. Wakelin) & YORKE (Warrington). The Production of General Symptoms in Haemoglobinaemia.—*Brit. Med. Jl.*, 1914. Jan. 31, pp. 235–238. With 3 text figs.

BIJON. Quelques Résultats expérimentaux au Sujet de la Pathogénie de la Fièvre bilieuse hémoglobinurique.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 64–68.

BOYÉ (L.). Relations entre la Consommation de la Quinine et la Fréquence de la Fièvre bilieuse hémoglobinurique au Tonkin.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 68-71.

BRUCE-PORTER (H. E. B.). Intravenous Injections in Blackwater Fever.—*Practitioner*, 1914. Feb. Vol. 92. No. 2 (No. 548), pp. 261–265. With 2 curves.

SÖRENSEN (N.). Die Urobilinsekretion im Harne bei Malaria, besonders beim Schwarzwasserfieber.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 5, pp. 159–163.

STEPHENS (J. W. W.). Blackwater Fever.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 217–238.

CHOLERA.

ARNAUD. Le Choléra dans l'Armée hellenique.—*Bull. Acad. Méd. Paris*, 1914. Seance du Mar. 17. 3 ser. 78 année. Vol. 71. No. 11, pp. 384–386.

AUMANN. Ueber die Maassnahmen bei der Bekämpfung der Cholera in Serbien 1913.—*Berlin. Klin. Wochenschr.*, 1914. Mar. 30. Vol. 51. No. 13, pp. 589–592.

BISHOP (T. H.). The Working of the Cholera Prevention Scheme on the Lower Ganges Bridge Construction.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 294–309. With 1 map.

CANDIOTTI. Le Transport Colloïdal des Médicaments dans le Choléra.—*Arch. de Méd. et Pharm. Navales*, 1914. Mar. Vol 101. No. 3, pp. 205–218.

CANSTATT (Laura & Tony). Choleraerfahrungen und ärztliche Tätigkeit eines berühmten deutschen Mediziners (Dr. Carl Canstatt) in Belgien.—*Janus*, 1914. Jan.–Feb. Vol. 19, pp. 1–16.

CANTACUZÈNE (J.) & MARIE (A.). Choléra gstro-intestinal expérimental chez le Cobaye.—*Compt. Rend. Soc. Biol.* 1914. Feb. 27. Vol. 76. No. 7, pp. 307–310.

CIACCIA (Matteo). Pathologisch-anatomische Beobachtungen über einige Fälle von Cholera asiatica.—*Centralbl. f. Bakt.*, 1 Abt. Orig., 1914. Mar. 21. Vol. 73. No. 3, pp. 161–169.

COURMONT (J.), LESIEUR (Ch.), DUFOUR (M.) & MARCHAND (M.). Etude anatomo-clinique et bactériologique de nouveaux Cas Lyonnais d'Entérite estivale cholériforme et dysentériforme à Microbes spiralés.—*Bulls. et Mém. Soc. Méd. des Hôpit. de Paris*, 1913. Dec. 25. 3e Sér. 29e Année. No. 38, pp. 848–855. With 1 text fig.

CRASTER (Charles V.). Ship-Borne Cholera. The Sea as a Factor in the Transmission of Asiatic Cholera.—*Jl. Amer. Med. Assoc.*, 1913. Dec. 20. Vol. 61. No. 25, pp. 2210–2214.

DÉFRESSINE (C.) & CAZENEUVE (H.). Sur la Persistance du Vibrion cholérique dans l'Organisme humain et dans quelques Milieux extérieurs.—*Arch. de Méd. et Pharm. Navales*, 1913. Dec. Vol. 100. No. 12, pp. 438–448.

—— & ——. Vibrions cholériques et paracholériques. Vibrions des Moules des Parcs de Brégaillon.—*Arch. de Méd. et Pharm. Navales*, 1914. Jan. Vol. 101. No. 1, pp. 46–55; Feb. No. 2, pp. 103–119.

DRENNAN (Jennie G.). A Non-Cholera Vibrio resembling the True Cholera Vibrio and a Pigment-forming Vibrio.—*Jl. of Infectious Diseases*, 1914. Mar. Vol. 14. No. 2, pp. 251–254.

DUNN (C. L.). Proposed Measures for Dealing with Cholera Epidemics in the United Provinces.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 220–234. 1913. Simla: Govt. Central Branch Press.

ECKERT. Die Rolle der Kontaktinfektion in der Epidemiologie der Cholera. (Nach in Bulgarien gesammelten Erfahrungen.)—*Berlin. klin. Wochenschr.*, 1913. Dec. 15. Vol. 50. No. 50, pp. 2326–2328.

FLU (P. C.). Een Cholera-achtige Vibrio als verwekster van een Klinisch op Echte Asiatische Cholera gelijkend Kiekteproces?—*Geneesk. Tijdschr. v. Nederl.-Indië*, 1913. Vol. 53. No. 6, pp. 771–783.

——. Onderzoekingen over de Agglutinabiliteit van Choleravibrionen uit de Galblaas van Choleralijders.—*Geneesk. Tijdschr. v. Nederl.-Indië*, 1913. Vol. 53. No. 6, pp. 808–831.

GASIOROWSKI (Napoleon). Die Cholera in Galizien im Jahre 1913.—*Das österreich. Sanitätswesen*, 1914. Mar. 26. Vol. 26. No. 13, pp. 161–180. With 4 text figs.

GLOSTER (T. H.). Notes on Vibrios isolated from Various Sources in Bombay during the Recent Outbreak of Cholera.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 252–264. 1913. Simla: Govt. Central Branch Press.

GREIG (E. D. W.). Observations on Disinfection in Cholera.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 200–203. 1913. Simla: Govt. Central Branch Press.

——. On the Cultivation of the Comma Bacillus from the Lung in a Case of Cholera.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 270–275. With 2 coloured plates.

——. The Precipitation of Bacterial Protein by Concentrated Salt Solution and its Relation to the Bacteriological Diagnosis of Cholera.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 276–293. With 1 plate.

——. On the Vitality of the Cholera vibrio outside the Human Body.—*Indian Jl. Med. Research*, 1914. Jan. Vol. 1. No. 3, pp. 481–504. With 1 chart.

HARRISS (S. A.). The Effect of Pipe Water Supplies on the Reduction of Cholera in Urban Areas.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 204–212. 1913. Simla: Govt. Central Branch Press.

IONESCO-MIHAESTI & CIUCA (M.). Sur une Race particulière de Vibrions cholériques (1).—*Compt. Rend. Soc. Biol.*, 1914. Feb. 27. Vol. 76. No. 7, pp. 310–312.

—— & ——. Sur Certains Caractères Biologiques du Vibrion Jamboli D.M. 310.—*Comp. Rend. Soc. Biol.*, 1914. Feb. 27. Vol. 76. No. 7, pp. 312–313.

KLIMENKO (W. N.). Zum Befunde choleraähnlicher Vibrionen bei Kindern. —*Centralbl. f. Bakt.* I. Abt. Orig., 1914. Feb. 25. Vol. 73. No. 2, pp. 127–134.

KNAPTON (H. A. F.). Some Practical Points in Dealing with Epidemics of Cholera.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 214–219. 1913. Simla: Govt. Central Branch Press.

LAFAURIE. Observations d'Accès pernicieux dysentériforme, choléríforme. (Clinique d'Outre-Mer.)—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 257–261.

LAMAS (L.). Estudio de Vibriones. *Vibrio freseris*, nov. sp. y *Vibrio vendrellensis*, nov. sp.—*Boletin Instituto Nacional de Higiene de Alfonso XIII*, 1913. Dec. 31. Vol. 9. No. 36, pp. 173–210. With 1 coloured and 2 black-and-white plates.

VAN LOGHEM (J. J.). The Difference between Vibrio Cholerae and Vibrio El-Tor.—*Trans. xvii. Intern. Congress of Med.*, London, 1913. Section xxi. Trop. Med. & Hyg. Pt. 2, pp. 53–55.

LOW (R. Bruce). The Manifestations of Cholera throughout the World during the Years 1911 and 1912.—*Forty-Second Ann. Report of the Local Govt. Board*, 1912–13. Supplement containing Report of Medical Officer for 1912–13, Appendix A. No. 2, pp. 88–147. 1914. London: H. M. Stationery Office. [Cd. 7181.]

MENDOZA (A.). Nota acerca del Cólera experimental en el Mono.—*Boletin del Instituto Nacional de Higiene de Alfonso XIII*, 1913. Sept. 30. Vol 9. No. 35, pp. 117–130.

MILLOUS. Observations d'Entérite à Forme pseudo-cholérique avec Présence de Protozoaires.—*Ann. d'Hyg. et de Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1174–1177.

MOUSTOUSES (Konstantin J.). Die Cholerabekämpfung in der griechischen Armee während des griechisch-bulgarischen Krieges.—*Der Militärarzt*, 1914. Mar. 7. Vol. 48. No. 4, pp. 65–71. [Ausgegeben mit Nr. 10 der *Wien. Med. Wochenschr*, 1914.]

PENFOLD (W. J.) & VIOLLE (H.). A Method of Producing Rapid and Fatal Intoxication with Bacterial Products, with Special Reference to the Cholera Vibrio.—*Brit. Med. Jl.*, 1914. Feb. 14, pp. 363–366.

ROSENTHAL (Franz). Medizinische Eindrücke von einer Expedition nach Bulgarien, speziell ein Beitrag zur Diagnose und Therapie der Cholera asiatica.—*Berlin. klin. Wochenschr.*, 1914. Feb. 23. Vol. 51. No. 8, pp. 342–344.

ROSS (W. C.). The Epidemiology of Cholera.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 152–158. 1913. Simla: Govt. Central Branch Press.

ROTKY (Karl). Immunisierungsversuche gegen den Vibrio El Tor.—*Zeitschr. f. Immunitätsforsch. u. experim. Therapie.* I. Teil. Orig., Mar. 10. Vol. 20. No. 6, pp. 644–672.

SCOTT (L. Bodley). Cholera and "Epidemic Doctors." [Correspondence.] —*Indian Med. Gaz.*, 1914. Jan. Vol. 49. No. 1, pp. 34–36.

STAMM (Johannes). Zur Frage der Veränderlichkeit der Choleravibrionen in Wasser.—*Zeitschr. f. Hyg. u. Infektionskr.*, 1914. Jan. 15. Vol. 76. No. 3, pp. 469–542. With 2 plates.

STRISOWER (Rudolf). Meine Erfahrungen aus der Choleraepidemie in Serbien im Sommer 1913.—*Wien. Klin. Wochenschr*, 1913. Dec. 11. Vol. 26. No. 50, pp. 2078–2081.

STUMPF (Julius). Ueber Cholerabehandlung und Choleraprophylaxe auf Grund meiner Erfahrungen in Nisch und Belgrad.—*München. Med. Wochenschr*, 1914. Apr. 7. Vol. 61. No. 7, pp. 759–763.

TURNER (J. A.). The Bacteriology of Cholera and its Relation to the Spread of the Disease from the Point of View of the Health Officer. —*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 236–251. 1913. Simla: Govt. Central Branch Press.

DYSENTERY (Bacillary and Unclassed).

(A.) Bacillary.

BOFINGER. Ueber eine durch den sog. Y-Bazillus hervorgerufene Ruhrepidemie.—*Deut. Militärarztl. Zeitschr.* 1914. Feb. 20. Vol. 43. No. 4, pp. 141–147.

DESDERI (Paolo). Una Nuova Epidemia di Dissenteria bacillare in Piemonte.—*Pathologica*, 1914. Feb. 15. Vol. 16. No. 127, pp. 99–101.

DUMAS (R.). Action de l'Emétine sur la Dysenterie bacillaire pure.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 140–141.

GETTINGS (H. S.). Dysentery, Past and Present. [Adjourned Discussion.]—*Jl. of Mental Science*, 1914. Jan. Vol. 60. No. 248, pp. 39–56. With 1 chart.

JOB (M. E.). La Dysenterie Bacillaire dans l'Armée.—*Arch. de Méd. et de Pharm. Militaires*, 1914. Jan. Vol. 63. No. 1, pp. 57–94; Feb. No. 2, pp. 143–181; Mar. No. 3, pp. 328–359.

ROGERS (Leonard). The Bactericidal Action of Organic Silver Salts and other Antiseptics on the Dysentery Bacillus.—*Indian Jl. Med. Research*, 1913. Oct. Vol. 1. No. 2, pp. 263–269.

(B.) Unclassed.

BAHR (P. H.). A Study of Epidemic Dysentery in the Fiji Islands, with special Reference to its Epidemiology and Treatment.—*Brit. Med. Jl.*, 1914. Feb. 7, pp. 294–296.

BETTS (A. J. V.). Emetine and Dysentery. [Correspondence.]—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, p. 124.

BOURRET (G.). La Dysenterie à Hué.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 678–681.

BRAU. L'Emétine à l'Hôpital de Saïgon (Cochinchine). IV. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et de Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1133–1150.

CASTELLANI (Aldo). Note on an Intestinal Protozoal Parasite producing Dysenteric Symptoms in Man.—*Jl. Trop. Med. & Hyg.*, 1914. Mar. 2. Vol. 17. No. 5, pp. 65–66.

——. A Further Case of Entoplasmosis.—*Jl. Trop. Med. & Hyg.*, 1914. Mar. 16. Vol. 17. No. 6, pp. 83-84.

COURMONT (J.), LESIEUR (Ch.), DUFOUR (M.) & MARCHAND (M.). Etude anatomo-clinique et bactériologique de nouveaux Cas Lyonnais d'Entérite estivale cholériforme et dysentériforme à Microbes spiralés.—*Bulls. et Mém. Soc. Méd. des Hôpit. de Paris*, 1913. Dec. 25. 3e Sér. 29e Année. No. 38, pp. 848-855. With 1 text fig.

CUNNINGHAM (J.) & HARVEY (W. F.). Dysentery. Problems and Proposals.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 268–276. 1913. Simla: Govt. Central Branch Press.

DUTCHER (B. H.). Note on a New Geographic Locality for *Balantidiosis coli*.—*Jl. Trop. Med. & Hyg*, 1914. Apr. 1. Vol. 17. No. 7, p. 99.

[A short note on a case of balantidial dysentery occurring in San Juan, Porto Rico.]

EVERS-ANGAUR. Ueber die Behandlung von Dysenterie mit Chinosol.—*Trans. xvii. Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 75–76.

GÄBEL (Max). Zur Pathogenität der Flagellaten. Ein Fall von Tetramitidendiarrhoe.—*Arch. f. Protistenkunde*, 1914. Mar. 28. Vol. 34. No. 1, pp. 1–34. With 2 plates.

HUDSON (C. T.). Notes on the Employment of Emetine in the Dharwar District.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, pp. 117–118.

KEUPER (E.). Ueber eine Ruhrendemie bei kleinen Kindern.—*München. Med. Wochenschr*, 1914. Mar. 3. Vol. 61. No. 9, pp. 474–476.

LAFAURIE. Observations d'Accès pernicieux dysentériforme, cholériforme. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 257–261.

LAPIN. De l'Action Cholagogue de l'Emétine et de son Emploi dans Quelques Cas d'Infections intestinales non Amibiennes.—*Revue Méd. d'Alger.*, 1914. Feb. No. 4, pp. 87–90.

[Notes of a few cases, mostly of catarrhal jaundice and enteritis, treated with seeming benefit with emetine given hypodermically.]

LUNN (W. E. C.). Toxaemic Arthritis as a Complication of Acute Dysentery.—*Jl. R. Army Med. Corps*, 1914. Mar. Vol. 22. No. 3, pp. 310–312.

LUTSCH (Walter). Ueber Ruhr-Behandlung.—*München. Med. Wochenschr.* 1914. Mar. 3. Vol. 61. No. 9, pp. 476–477.

MADDOCK (E. C. G.). A Note on Three Cases treated with Emetine.—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, p. 118. With a chart.

MARTEL. L'Emétine à l'Hôpital de Saïgon (Cochinchine). I. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1118–1122.

MATHIS (C.). Troubles intestinaux dus au Protozoaire Flagellé : *Lamblia intestinalis* (Lambl. 1859).—*Bull. Soc. Med. Chirurg. Indo-chine*, 1914. Feb. Vol. 5. No. 2, pp. 55–61. With 2 plates.

MAURRAS & HERVIER. L'Emétine à l'Hôpital de Saïgon (Cochinchine). III. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1128–1133.

MAYER (Martin). Beitrag zur Emetinbehandlung der Ruhr. (Die Wirkung des Emetins bei der Lamblienruhr.)—*München. Med. Wochenschr.*, 1914. Feb. 3. Vol. 61. No. 5, pp. 241–242.

MORISON (J.) & CHITRE (G. D.). Interim Report on the Causes of Diarrhoea in Poona.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 278–283. 1913. Simla : Govt. Central Branch Press.

NOGUÉ. L'Emétine à l'Hôpital de Saïgon (Cochinchine). II. Cas où les Injections de Chlorhydrate d'Emétine ont eu une Action curative évidente. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1122–1127.

SEGUIN. Quelques Observations de Dysenterie traitée par l'Emétine. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1155–1161.

TEISSIER (Pierre). Presence de Spirilles dans l'Intestin, leur Importance ; à propos de deux Cas de Dysenterie amoebo-spirillaire.—*Bull. Acad. Méd. Paris*, 1914. Jan. 13. 3 sér. Vol. 71, (78e année), pp. 51–52.

WALKER (Ernest Linwood). Experimental Balantidiasis.—*Philippine Jl. of Science*, Sect. B. Trop. Med., 1913. Oct. Vol. 8. No. 5, pp. 333–349. With 7 plates.

FEVERS (Unclassed,) and DENGUE.

ALFRED-KHOURY (M.). L'Insuffisance surrénale dans la Fièvre Dengue.—*Bulls. et Mém. Soc. Méd des Hôpit. de Paris*, 1913. Nov. 13. 3e sér. 29e année. No. 32, pp. 498–499.

GAIDE. Note sur la Dengue en Annam-Tonkin. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et de Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1177–1181.

GATTO (Alfredo). Sulla Febbre di Malta e sulla Febbre dei Tre Giorni a Scilla (Calabria).—*Malaria e Malat. d. Paesi Caldi*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 121–123.

GOUZIEN. Fièvre indéterminée observée sur l'Aviso la *Manche* en Septembre–Octobre, 1911. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 233–235.

DE LUCA (Michele). Sulla Febbre dei Tre Giorni a Parghelia (Catanzaro).—*Malaria e Malat. d. Paesi Caldi*, 1914. Feb. Vol. 5. No. 1, pp. 23–25.

MITCHELL (Douglas A.). Seven Days Fever of the Indian Ports—*Statistical Report of the Health of the Navy for the Year*, 1912, pp. 186–191. 1913. London: H. M. Stationery Office.

NICOLAS (Ch.). Quelques Cas de Fièvres d'Origine indéterminée simulant le Paludisme en Nouvelle-Calédonie.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 133–136.

SPAGNOLIO (Giuseppe). Sulla Epidemia di Febbre dei Tre Giorni osservata a Messina nell'Estate 1913 (Quarta).—*Malaria e Malat. d. Paesi Caldi.*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 125–127.

TIMPANO (Pietro). Sette Casi di Febbre Dengue a Bova Marina.—*Malaria e Malat. d. Paesi Caldi*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 124–125.

FILARIASIS.

BAHR (P. H.). On Elephantiasis and Filariasis.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 295–296.

DES BARRES (Le Roy). Filariose-Varicocèle lymphatique—Présence d'un Ganglion dans le Canal inguinal simulant une Epiplocèle (Observation résumée).—*Bull. Soc. Méd.-Chirurg. de l'Indochine*, 1913. Dec. Vol. 4. No. 10, pp. 448–450.

FÜLLEBORN (F.). Ueber die Lage von *Mikrofilaria loa* (*diurna*) im Trockenpräparat.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 232–234. With 2 plates & 1 text fig.

HUDELLET (G.). Contribution à la Distribution géographique de la Filariose en Afrique occidentale française.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 115–123.

JOHNS (Foster M.) & QUERENS (Percy L.). Further Note on the Growth of Filarial Embryos in Vitro.—*Amer. Jl. Trop. Diseases & Preventive Med.*, 1914. Mar. Vol. 1. No. 9, pp. 620–624. With 1 plate.

KÜLZ (L.). Bemerkungen zu Ziemann "Tropische Gewebsentzündungen infolge von Filaria-Infektion" in Heft 14, 1913 des Archivs.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 5, pp. 164–166.

——. Beitrag zur Turnusfrage der Mikrofilarien.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 248–250.

LEGER. Recherches au Laboratoire de Bamako (Soudan français), sur l'Index paludéen, l'Index filarien, la Tuberculose et la Trypanosomiase humaine.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 77–81.

LEGER (M.) & LE GALLEN (R.). Fréquence de *Filaria bancrofti* chez des Sujets de la Guadeloupe de présentant ni Eléphantiasis ni Accidents lymphangitiques.—*Bull Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 125–129.

MATHIS. Considérations sur le Paludisme et la Filariose en Indochine. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et. Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 215–228.

RODENWALDT (Ernst). Bemerkung zu der Arbeit "Eine neue Mikrofilaria usw." in Heft1, 1914 des Archivs.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 6, p. 211.

[A note explaining why the author did not refer to FÜLLEBORN & SIMON'S recently published work on the same subject. [See this *Bulletin* Vol 3, p. 100]. His paper had gone to press before he received that of FÜLLEBORN & SIMON. He believes that his work agrees with theirs in all essentials.]

ZIEMANN (H.). Bemerkungen zu Prof. Külz, Archiv. Bd.18. Heft 5, S.164.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 235–236.

Elephantiasis.

BAHR (P. H.). On Elephantiasis and Filariasis.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 295–296.

GROTHUSEN. Zur operativen Behandlung der Elephantiasis scroti.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 250–252.

MOREAU (Laurent). Note sur un Cas d'Eléphantiasis des Membres inférieurs.—*Ann. de Dermatol. et Syph.*, 1914. Mar. 5 ser. Vol. 5. No. 3, pp. 148–154. With 3 figs.

PATTERSON (James). Elephantiasis, with a Report of a Case.—*Jl. Amer. Med. Assoc.*, 1914. Mar. 21. Vol. 62. No. 12, p. 916. With 1 text fig.

WILLS (E. F.). Lymphangioplasty in Elephantiasis. (Correspondence.)—*Brit. Med. Jl.*, 1914. Mar. 21. p. 652.

Dracontiasis.

TURKHUD (D. A.). Dracontiasis.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 118–120. 1913. Simla: Govt. Central Branch Press.

YAKIMOFF (W. L.). Recherches sur les Maladies Tropicales Humaines et Animales au Turkestan. VI. La Formule leucocytaire du Sang des Malades renfermant *Filaria medinensis*.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, p. 192.

Filariasis of Animals.

DELANOË (P.) Au Sujet de l'Existence chez un Saurien, *Agama colonorum* Dum. et Bibr., d'une Filaire et d'une Microfilaire sanguines.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 121–125. With 26 figs.

RAILLIET & HENRY. *Filaria furcata*. (Correspondence.)—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, p. 175.

SULDEY (E. W.). Existence d'une Filaire et d'une Microfilaire chez le Caméléon de Madagascar.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 70–71.

YAKIMOFF (W. L.) & SCHOKHOR (N. I.). Recherches sur les Maladies Tropicales Humaines et Animales au Turkestan. IV.—Les Microfilaires des Animaux domestiques au Turkestan.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 188–189.

——, ——, KOSELKINE (P.M.), WINOGRADOFF (W. W.) & DEMIDOFF (A. P.). Recherches sur les Maladies Tropicales Humaines et Animales au Turkestan. V.—La Microfilariose des Chevaux au Turkestan.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 189–192.

HEAT STROKE.

BOPPE & ORTICONI. Syndrome méningé consécutif a une Insolation. Simulant une Méningite cérébro-spinale.—*Arch. de Méd. et de Pharm. Militaires*, 1914. Feb. Vol. 63. No. 2, pp. 209–212. With 1 temperature chart.

GROBER. Behandlung akut bedrohlicher Erkrankungen. Ein Zyklus klinischer Vorträge. VI. Behandlung des Hitzschlags, des Sonnenstichs und der Starkstromverletzungen.—*Deut. Med. Wochenschr.*, 1914. Jan. 1. Vol. 40. No. 1, pp. 1–3.

SEGALE (Mario). Sulla Termocalorimetria del Colpo di Calore.—*Pathologica*, 1913. Oct. 15. Vol. 5. No. 119, pp. 597–602. With 7 charts.

HELMINTHIASIS.

TREMATODES.

LARA (Abelardo). Hemoptisis endemica de los Paises Tropicales.—*Revista Med. de Yucatan*, 1913. Vol. 9. No. 1, pp. 1–5.

NICOLL (William). The Trematode Parasites of North Queensland. I.—*Parasitology*, 1914. Jan. Vol. 6. No. 4, pp. 333–350. With 2 plates.

Schistosomiasis.

ARCHIBALD (R. G.). Intestinal Schistosomiasis in the Sudan. With Notes on the Treatment of two Cases by means of Autogenous Vaccines of Coli-like Organisms.—*Brit. Med. Jl.*, 1914. Feb 7, pp. 297–299. With 4 charts.

CONOR (A.). Essais de Transmission de la Bilharziose.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 202–206.

KATSURADA (F.). Schistosomiasis japonica.—*Trans. xvii Intern. Congress of Med., London*, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 151–161.

LEGER (Marcel). Les Porteurs de Bilharzies (*Schistosomum mansoni*) à la Gaudeloupe.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1 pp. 75–78.

MILTON (Frank). Does Bilharzia (Schistosomiasis) exist in India?—*Indian Med. Gaz.*, 1914. Jan. Vol. 49. No. 1, pp. 10–14.

WHITE (H.). A Case of Schistosomiasis japonica.—*Lancet*, 1914. Jan. 17, pp. 172–173.

CESTODES.

Taeniasis (Intestinal).

BLANCHARD (R.) with LEROUX (Ch.) & LABBE (R.). Encore un Cas de *Dipylidium caninum* à Paris.—*Bull. Acad. Méd. Paris*, 1913. Séance du 9 Déc. 3 ser. Vol. 70. (77e année). No. 39, pp. 498–508.

BLANCHARD (R.). Encore un Cas de *Dipylidium caninum* à Paris.—*Arch. de Parasit.*, 1914. Mar. Vol. 16. No. 3, pp. 438–447.

VINCENZO (Rosei). Di un Caso rarissimo di Infestazione umana da *Dipylidium caninum* (Lin.)—*Policlinico*. Sez. pratica, 1914. Mar. 29. Vol. 31. No. 13, pp. 458–460.

Taeniasis (Somatic).

STUART (E. Gertrude). Hydatid of the Omentum. [Correspondence.]—*Brit. Med. Jl.*, 1914. Mar. 7, p. 531.

NEMATODES.

Ankylostomiasis.

BLIN (G.). L'Uncinariose chez les Chercheurs d'Or et les Forcats du Maroni.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 149–176.

CARINI (A.). La Bonifica umana nella Lotta contro l'Anchilostomiasi.—*Revista d. Igiene e d. Sanita Pubblica*, 1913. Vol. 24. 8 pp.

CAVALLONE (Giovanni). L'Anchilostomiasi in Desana.—*Gazz. d. Ospedali e d. Cliniche*, 1913. Dec. 11. Vol. 34. No. 148, pp. 1551–1552.

de FARIA (Gomes). Ainda sobre o "*Agchylostoma braziliense*" (Gomes de Faria, 1910). (Resposta ao trabalho de R. Leiper: The Apparent Identity of "*Agchylostoma ceylanicum*" Looss, 1911, and *A. braziliense*—G. de Faria, 1910).—*Brazil Medico*, 1914. Mar. 22. Vol. 28. No. 12, p. 113.

GILL (C. R.). Uncinariasis or Hookworm Disease. Being the Record of a Campaign in Porto Rico against the Hook Worm.—13 pp. 1913. San Juan, Porto Rico.

NICOLL (William). The Blood Volume in Ankylostomiasis. With some Biological Notes relating to the Disease.—*Jl. of Hygiene*, 1914. Jan. 19. Vol. 13. No. 4, pp. 369–392.

WHITE (Mark J.). Examinations for Hookworm Ova. Technique for the Examination of Fresh Material and for Making Permanent Mounts of the Specimens.—*U.S. Public Health Rep.*, 1914. Feb. 20. Vol. 29. No. 8, p. 462.

Trichocephaliasis.

CHRISTOFFERSEN (N. R.). *Trichocephalus dispar* im Darmkanal des Menschen.—*Beitrage z. pathol. Anat. u. allgem. Pathol.*, 1914. Jan. 20. Vol. 57. No. 3, pp. 474–515. With 1 plate.

Trichinelliasis.

GRUBER (Georg B.). Neue Studien über Pathologie der Trichinose.—*München. Med. Wochenschr.*, 1914. Mar. 24. Vol. 61. No. 12, pp. 645–648.

Ascariasis.

BORINI (Agostino). Pseudo-Appendicite da Ascaridi.—*Arch. de Parasit.* 1914. Mar. Vol. 16. No. 3, pp. 428–431.

ENERNAO (Togliani). Sopra un Caso di Morte causate da Ascaridi.—*Policlinico.* Sez. Pratica, 1914. Feb. 1. Vol. 21. No. 5, p. 163.

HIROTA (K.). An Example of Retinitis caused by *Ascaris lumbricoides.* [In Japanese.]—*Sei-I-Kwai Med. Jl.*, 1914. Mar. 10. Vol. 33. No. 3. [Whole No. 385.]

PFLUGRADT (R.). Askariden in den Gallenwegen.—*Deut. Med. Wochenschr.* 1914. Jan. 29. Vol. 40. No. 5, pp. 227–228.

SERUM AND TISSUE REACTIONS, TOXINS, &c.

GUERRINI (Guido) Della Emocosinofilia nelle Infestioni Intestinali Zooparassitarie.—*Arch. de Parasit.*, 1914. Mar. Vol. 16. No. 3. pp. 337–363. With 4 text figs.

MANOILOFF (E.). Untersuchungen mit dem Abderhaldenschen Dialysierverfahren bei Helminthiasis.—*Wien. Klin. Wochenschr.*, 1914. Mar. 12. Vol. 27. No. 11, pp. 269–271.

RACHMANOW (A.). Lésions du Système nerveux dans l'Intoxication vermineuse.—*Ann. Inst. Pasteur*, 1914. Feb. Vol. 28. No. 2, pp. 181–193. With 6 text figs.

WEINBERG (M.) & CIUCA (A.). Anaphylaxie hydatique passive et sérodiagnostic de l'Echinococcose.—*Compt. Rend. Soc. Biol.*, 1914. Mar. 6. Vol. 76. No. 8, pp. 340–342.

GENERAL AND UNCLASSED.

JOUVEAU-DUBREUIL (H.). Helminthiase Intestinale et Hépatique dans la Population Chinoise de Tchentou (Setchouen, Chine Occidentale). —*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 704–708.

LEGER (Marcel) & SAUVET (Ch.). Helminthiase intestinale de la Guadeloupe.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 71–75.

MACHT (David I.). Two Cases of Helminthemesis (from the Out-Patient Department of the Johns Hopkins Hospital).—*Johns Hopkins Hospital Bull.*, 1914. Apr. Vol. 25. No. 278, p. 132.

MATHIS. L'Helminthiase, le Goitre, la Lèpre dans la haute Région du Tonkin (Langson-Caobang).—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1. pp. 197–215.

KALA AZAR (and Tropical Sore.)

BASSETT-SMITH (P. W.). Case of Kala-azar (Parasitic Splenomegaly) in an Adult from Malta.—*Proc. Roy. Soc. Med.*, 1914. Mar. Vol. 7. No. 5. Clinical Section, pp. 87–90. With 2 text figs.

CANNATA (S.). Ulteriori Ricerche sulla Presenza del Parassita di Leishman nel Sangue periferico di Bambini affetti da Leishmaniosi.—*Pediatria*, 1914. Jan. Vol. 22. No. 1, pp. 27–32. With 1 plate.

CARONIA (G.). Fieberkurven bei der kindlichen Leishmaniosis.—*Deutsch. Arch. f. Klinische Medizin*, 1914. Jan. 31. Vol. 113. No. 3/4, pp. 354–371.

CONOR (A) & CALÔ (E.). Le Troisième Cas de Kala-azar d'Origine algérienne.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol.7. No. 1, pp. 42–43.

GABBI (U.). Il Kala-azar Indiano e Mediterraneo sono Identici. Nuove Indagini sperimentali.—*Malaria e Malat. d. Paesi Caldi.*, 1914. Feb. Vol. 5. No. 1, pp. 14–22; and *Pathologica*, 1914. Feb. 1. Vol. 6. No. 126, pp. 69–74.

——. PELLEGRINO (Paolo Lombardo) & MONTORO (Giuseppe). Untersuchung über die Kala-azar in den östlichen Provinzen Siziliens und Unter-Kalabriens, sowie über die erzielten Resultate.—*Centralbl. f. Bakt.* 1. Abt. Orig., 1914. Jan. 24. Vol. 72. No. 6/7, pp. 505–516.

JANNOT (A.). Infection de la Souris avec le Virus de la Leishmaniose canine naturelle.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 683–685.

JEMMA (R.). Brevi Considerazioni su 110 Casi di Leishmaniosi infantile osservati nella Clinica Pediatrica di Palermo.—*Pediatria*, 1914. Feb. Vol. 22. No. 2, pp. 81–94.

LA CAVA (Francesco). Un Caso di Leishmaniosi Interna (Kala-azar) in una Giovinetta di xiv Anni.—*Pathologica*, 1914. Mar. 15. Vol. 6. No. 129, pp. 151–153.

LAVERAN (A.) Au Sujet d'un Cas de Leishmaniose canine signalé à Marseille.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 173–174.

——. Les Leishmanioses. (Abstract from Report.)—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. & Hyg. Pt. 2, pp. 179–182.

LEMAIRE (G.) SERGENT (Ed.) & LHÉRITIER (A.). La Leishmaniose naturelle du Chien à Alger. Etude clinique et anatomo-pathologique.—*Rev. Méd. d'Alger.*, 1914. Jan. pp. 1–14. With 3 text figs.

——, & ——. & ——. Spécificité de la Kératite observée chez les Chiens atteints de Leishmaniose naturelle.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 193–196.

LIGNOS (Antoine). Troisième Cas de Guérison de Kala-azar infantile observé à Hydra.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 43–45.

——. De l'Epoque de l'Apparition du Kala-Azar à Hydra.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 45–46.

——. La Mortalité par Kala-Azar à Hydra pendant l'Année 1911.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, p. 193.

MAYER (Martin) & WERNER (Heinrich). Kultur des Kala-Azar-Erregers (*Leishmania donovani*) aus dem peripherischen Blut des Menschen.—*Deut. Med. Wochenschr.*, 1914. Jan. 8. Vol. 40. No. 2, pp 67–68.

NICOLLE (Charles). Aperçu sur le Kala-Azar.—*Presse Méd.*, 1914. Mar 18. No. 22, pp. 213–214. With 2 figs.

PITTALUGA (Gustavo). Kala-Azar infantile e Leishmaniosi canina in Ispagna.—*Pathologica*, 1914. Mar. 1. Vol. 6. No. 128, pp. 121–123.

PRICE (J. Dodds) & ROGERS (Leonard). The Uniform Success of Segregation Measures in Eradicating Kala-Azar from Assam tea gardens; its Bearing on the Probable Mode of Infection.—*Brit. Med. Jl.*, 1914. Feb. 7. pp. 285–289.

PRINGAULT (E.). Existence de la Leishmaniose canine à Marseille.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 41–42.

SALVATORE (Domenico). Colture di Leishmania hominis iniettate nel Peritoneo dei Cani.—*Malaria e Malat. d. Paesi Caldi.*, 1914. Feb. Vol. 5. No. 1, pp. 29–32.

DA SILVA (Pereira). Notes sur le Kala-Azar.—*Arquivos do Instituto Bacteriologico Camara Pestana*, 1913. Vol. 4. No. 2, pp. 147–172. With 2 coloured plates and 3 text figs.

SPAGNOLIO. Leishmaniosi Umana e Canina. Studio d'Ambiente.—*Riforma Medica*, 1914. Feb. 14. Vol. 30. No. 7, pp. 179–182.

VISENTINI (Arrigo). Ricerche Morfologiche, Culturali e Biologiche sulla Leishmania della Leishmaniosi spontanea del Cane.—*Rendiconti d. R. Accademia dei Lincei*, 1913. Dec. 7. Vol. 22. Ser. 5. 2 Sem. No. 11, pp. 582–587.

WENYON (C. M.). Kala-Azar in Malta, with some Remarks on the Various Leishmaniases.—*Trans. Soc. Trop. Med. & Hyg.*, 1914. Jan. Vol. 7. No. 3, pp. 97–111. With 1 plate.

——. The Culture of Leishmania from the Finger-Blood of a Case of Indian Kala-Azar, with some Remarks on the Nature of Certain Granular Bodies recently described from this Disease.—*Jl. Trop. Med. & Hyg.*, 1914. Feb. 16. Vol. 17. No. 4, pp. 49–51.

WHIPHAM (T. R.). Case of Kala-Azar.—*Proc. Roy. Soc. Med.*, 1914. Feb. Vol. 7. No. 4. Section for the Study of Disease in Children, pp. 63–64.

YAKIMOFF (W. L.) & SCHOKHOR (N. I.). Recherches sur les Maladies Tropicales Humaines et Animales au Turkestan. I. Répartition de la Leishmaniose canine au Turkestan.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, p. 185.

Tropical Sore (Dermal Leishmaniasis.)

BARBARA (Mario). Nuovo Caso di Leishmaniosi Cutanea a Forma Molteplice.—*Malaria e Malat. d. Paesi Caldi.*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 91–97. With 1 fig.

BRUMPT (E.) & PEDROSO (A.). Recherches Epidémiologiques sur la Leishmaniose forestière Américaine dans l'Etat de São-Paulo (Brésil).—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 752–762.

CHATTON (Edouard). Le Bouton d'Orient (Clou de Gafsa) dans le Djerid. Ses Relations avec le Facies rupestre du Sol.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 30–35. With a map.

FOLEY (H.), VIALATTE (C.) & ADDE (R.). Existence dans le Sud-Marocain (Haut-Guir) du Bouton d'Orient à l'Etat endémique.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 114–115.

GAUCHER & BLOCH (Maurice). Bouton de Biskra et Réaction de Wassermann.—*Bull. de la Soc. Francaise de Dermatol. et Syph.*, 1914. Jan. Vol. 25. No. 1, pp. 2–4.

GIUGNI (Francesco). Note Ematologiche su 4 Casi di Leishmaniosi Esterna (Bottone d'Oriente).—*Malaria e Malat. d. Paesi. Caldi.*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 98–105. With 1 fig.

GORGA (José). Leishmaniose das Mucosas.—*Revista Med. de S. Paulo*, 1914. Feb. 15. Vol. 17. No. 3, pp. 35–40. With 3 figs.

GUERREIRO (Cezar). Da Reacção de Bordet e Gengou na Leishmaniose. (Nota preliminar.)—*Brazil Medico*, 1914. Jan. 8. Vol. 28. No. 2, pp. 11–12.

HUNTEMÜLLER. Neuartige Parasitenbefunde bei der Jerichobeule.—*Centralbl. f. Bakt.* I. Abt. Orig., 1914. Feb. 25. Vol. 73. No. 2, pp. 137–141. With 3 plates and 1 text fig.

JEANSELME (E.). Leishmaniose cutanée à Foyers multiples et à Marche extensive très améliorée par le Salvarsan et le Néosalvarsan.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol 7. No. 1, pp. 36–41.

——. Bouton d'Orient à Foyers multiples et à Tendance extensive, très amélioré par le Traitement d'Ehrlich.—*Bull. de la Soc. Francaise de Dermatol. et Syph.*, 1914. Jan. Vol. 25. No. 1, pp. 4–10.

LA CAVA (Francesco). Sulla Frequenza, Diffusione e Sindrome della Leishmaniosi della Cute e delle Mucose (L. *esterna*) nell'Italia inferiore.—*Malaria e Malat. d. Paesi Caldi.*, 1913. Oct.–Dec. Vol. 4. No. 6–7–8, pp. 352–358.

[Reprint of a paper reviewed in this *Bulletin*, Vol. 2, p. 451.]

MCEWEN (Ernest L.). Oriental Sore in the Americas, with Report of a Case.—*Jl. of Cutaneous Diseases including Syphilis*, 1914. Apr. Vol. 32. No. 4 [Whole No. 379], pp. 275–286. With 1 plate.

WAGON (P.). Un Deuxième Cas de Leishmaniose cutanée observé au Dahomey et traité par l'Arsénobenzol Billon en Lavements.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 46–48.

YAKIMOFF (W. L.) & SCHOKHOR (N. I.). Recherches sur les Maladies Tropicales Humaines et Animales au Turkestan. II. La Leishmaniose cutanée (Bouton d'Orient) spontanée du Chien du Turkestan.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 186–187. With 1 text fig.

LEPROSY.

BAYON (H.). The Micro-Organism of Leprosy ; Has it been cultivated ?—*Lepra*, 1914. Feb. Vol. 14. No. 4, pp. 187–191. With 4 coloured plates.

v. BERGMANN (A.). Lepra. (Vortrag, gehalten auf den xxiii. Liol. Aerztetage in Dorpat 1913).—*St. Petersburg. Med. Zeitschr*, 1914. Jan. 1. (14). Vol. 39. No. 1, pp. 1–2.

BIEHLER (R.). Die Krebssterblichkeit unter den Leprakranken des Rigaschen städtischen Leprosoriums.—*Lepra*, 1914. Jan. Vol. 14. No. 3, pp. 141–148. With 3 figs.

COLOMBIER (P.). Lésions osseuses précoces dans la Lèpre constatées par la Radiographie.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 2–3. With 1 plate.

DAVIES (T. S.). Further Notes on the Specific Treatment of Leprosy by a Cultural Extract.—*S. African Med. Rec.*, 1914. Mar. 14. Vol. 12. No. 5, pp. 77–78.

DUVAL (Charles). Pertinent Remarks upon the Cultivation of the Leprosy Bacillus.—*Trans. xvii. Intern. Congress of Med.*, London, 1913. Sect. iv. Bacteriology & Immunity. Pt. 2, pp. 103–109.

FAMBRI (Elena). Osservazioni Anatomo-Patologiche Intorno ad un Caso di "Lepra universalis."—*Pathologica*, 1914. Jan. 1. Vol. 6. No. 124, pp. 10–14.

FRASER (H.) & FLETCHER (W.). The Dependence of Leprosy on Fish-eating. [Correspondence.]—*Lancet*, 1914. Feb. 21. p. 573.

HEISER (Victor G.). Leprosy. Treatment of Two Cases with apparent Cure.—*U. S. Public Health. Rep.*, 1914. Jan. 2. Vol. 29. No. 1, pp. 21–22.

——. Leprosy after Two-Year Incubation Period.—*Jl. Amer. Med. Assoc.*, 1914. Jan. 17. Vol. 62. No. 3, p. 205.

[A note on the case of a Filipino girl who was found infected with leprosy two years after birth, the father and mother having both suffered from the disease.]

HONEIJ (James A.). Leprosy. Some Notes on Symptoms.—*Boston Med. & Surg. Jl.*, 1914. Jan. 15. Vol. 170. No. 3, pp. 85–87.

——. Leprosy. The Pulse as a possible Indicator of the Progress of the Disease. (A Preliminary Note.)—*Boston Med. & Surg. Jl.*, 1914. Feb. 12. Vol. 170. No. 7, pp. 233–235. With charts.

JAMIESON (W. R.). A Case of Maculotubercular Leprosy.—*Jl. Amer. Med. Assoc.*, 1914. Jan. 3. Vol. 62. No. 1, p. 36.

[Brief notes on a case of leprosy in a Mexican male, aged 40, of Indian type, living with a father, mother and sister, none of whom were infected.]

LEBOEUF. La Lèpre en Nouvelle-Calédonie et Dépendances.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 177–197.

LEBOEUF (A.) & SALOMON (E.). La Lèpre en Nouvelle-Calédonie. I. Nombre et Distribution géographique des Lépreux. II. Marche de la Maladie dans l'Archipel. III. Organisation de la Prophylaxie. —*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 218–232.

MARCHOUX (E.). La Lèpre des Rats.—*Presse Méd.*, 1914. Mar. 14. No. 21, pp. 201–203.

MATHIS. L'Helminthiase, le Goitre, la Lèpre dans la haute Région du Tonkin (Langson-Caobang).—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 197–215.

MOREAU (Laurent). A propos de la Prophylaxie de la Lèpre. Les Léproseries des îles Comores.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 91–95. With 2 figs.

NETTER (Arnold). Rapport relatif aux Mesures spéciales de Prophylaxie qu'il conviendrait de prendre dans la France continentale à l'Égard de la Lèpre, au Nom d'une Commission, composée de MM. Balzer, Blanchard, Gaucher, Hallopeau, Roux, Widal et Arnold Netter.— *Bull. Acad. Méd., Paris.* Séance du 27 Jan. 3 ser. Vol. 71. (78e année) No. 4, pp. 98–125; Séance du 3 Fev. No. 5, pp. 176–186. [Discussion.]

PAUTRIER (L. M.). Le Diagnostic de la Lèpre par les Méthodes de Laboratoire.—*Presse Méd.*, 1914. Mar. 14. No. 21, pp. 203–204.

PEIPER (Otto). Die Bekämpfung der Lepra in Deutsch-Ostafrika.— *Lepra*, 1914. Feb. Vol. 14. No. 4, pp. 192–250. With 2 plates, 34 text figs. and 1 map.

ROST (E. R.). On the Leprosy Bacillus and Allied Bacilli.—*Trans. xvii. Intern. Congress of Med.*, London, 1913. Sect. iv. Bacteriology & Immunity. Pt. 2, pp. 111–118.

SADIKOFF (Ivan). Ueber die Lepra-Frage in Kurland. (Vortrag, gehalten auf dem Kurl. Aerztetage zu Mitau, 1913).—*St. Petersburg. Med. Zeitschr.*, 1914. Jan. 15 (28). Vol. 39. No. 2, pp. 15–17.

Sadikoff (Ivan). Ueber die "Lepra-Frage" in Kurland.—*Lepra*, 1914. Jan. Vol. 14. No. 3, pp. 125–130.

Schmitter (Ferdinand). Leprosy in its Relation to Treponematous Disease.—*Military Surgeon*, 1914. Apr. Vol. 34. No. 4, pp. 311-315.

Wolbach (S. B.) & Honeij (James A.). A Critical Review of the Bacteriology of Human and Rat Leprosy.—*Jl. of Med. Research*, 1914. Jan. Vol. 29. No. 3 (New Series Vol. 24) (Whole No. 142), pp. 367–423.

Wolbach (S. B.) & Honeij (James A.). The Diphtheroid Bacillus from Leprosy Lesions.—*Jl. of Med. Research*, 1914. Mar. Vol 30. No. 1 (New Ser. Vol. 25) (Whole No. 143), pp. 1–8. With 2 plates.

Woolley (Paul G.). Cultivation of the Bacillus of Leprosy: A Review.—*Amer. Jl. Trop. Dis. & Prevent. Med.*, 1914. Feb. Vol. 1. No. 8, pp. 580–583.

Zambaco Pacha (Démétrius Al.). La Lèpre a travers les Siècles et les Contrées.—xii + 845 pp., 1914. Paris: Masson & Cie. [Price 12 fr.]

MALARIA.

Allain (J.). Paludisme et Quinine d'Etat en Annam pendant l'Année 1912.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 730–744.

Babington (W. H.). Appendicitis simulated by Malaria.—*Jl. R. Army Med. Corps*, 1914. Jan. Vol. 22. No. 1, pp. 82–83.

Bass (C. C.). Cultivation of Malarial Plasmodia in vitro.—*Amer. Jl. Trop. Dis. & Prevent. Med.*, 1914. Feb. Vol. 1. No. 8, pp. 546–564. With 4 plates.

Bertarelli (Ernesto). Wenig erörterte Fragen aus dem Gebiete des Malariaschutzes und der Lehre von der Malaria.—*Centralbl. f. Bakt.* 1. Abt. Referate, 1914. Jan. 31. Vol. 60. No. 10, pp. 289–297.

Boernstein. Zur Malariabekämpfung durch moskitolarvenfeindliche Fische im Bismarckarchipel.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 1, pp. 21–26. With 4 curves.

Bouffard (Gustave). De quelques Considérations d'Ordre épidémiologique sur le Paludisme.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 25–30.

Brignone (Emiliano). La Propaganda e Profilassi Antimalarica nelle Scuole Comunali di Terranova Monferrato durante l'Anno 1913.—*Propaganda Antimalarica*, 1914. Feb. 28. Vol. 7. No. 1, pp. 12-15.

Brooke (Roger). Concerning the Freedom of Cebu from Malarial Fever.—*Military Surgeon*, 1914. Mar. Vol. 34. No. 3, pp. 201–204.

Broquet (Ch.). Paludisme et Culicides au Petchili.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 110–112.

Cacace (Ernesto). Educazione Antimalarica e Profilassi Antimalarica Scolastica in Italia nel 1912.—*Propaganda Antimalarica*, 1913. Dec. 31. Vol. 6. No. 6, pp. 125–132.

Carter (H. R.). Quinine Prophylaxis for Malaria.—*U. S. Public Health Rep.*, 1914. Mar. 27. Vol. 29. No. 13, pp. 741–749.

Chimisso (Luigi). Contributo alle Manifestazioni Cutanee della Malaria, con Particolare Riguardo a una Forma di Ectima.—*Riforma Medica*, 1914. Mar. 28. Vol. 30. No. 13, pp. 345–348; Apr. 4. No. 14, pp. 373–380. With 4 figs.

Christin (E. F.). Traitement arsenical d'un Cas de Purpura d'Origine probable Paludéenne.—*Rev. de Méd. et d'Hyg. Tropicales*, 1913. Vol. 10. No. 4, pp. 208–211.

CLARENC (H.). Les Méthodes d'Administration de la Quinine.—*Bull. Soc. Méd. de l'Ile Maurice*, 1913. Oct.–Nov.–Dec. Vol. 31. 2me Série. No. 34, pp. 51–62.

DENEUFBOURG. Paludisme observé dans le Corps d'Occupation de Chine (Chine du Nord).—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 53–63.

DEPPE (L.). Intravenöse Sublimatinjektionen bei tropischer Malaria mit latenter Sepsis.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 2, pp. 51–53.

DUPUY. Fièvre paludéenne compliquée de Lésions diverses. Extrait du Rapport du Poste Consulaire de Canton (1912). [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 261–262.

[Record of a case of malaria with typhoid-like symptoms. The species of parasite is not recorded.]

ETTINGER (Witold). Drei Fälle von Malaria mit ungewöhnlich schweren Symptomen.—*Wien. Klin. Wochenschr.*, 1914. Jan. 15. Vol. 27. No. 3, pp. 49–50.

VON EZDORF (R. H.). Malarial Index Work. Methods used in obtaining Blood, Making Blood Smears, and Staining.—*U. S. Public Health Rep.*, 1913. Dec. 26. Vol. 28. No. 52, pp. 2830–2833.

[Describes the routine methods adopted for obtaining rapid, accurate and uniform results in malarial index work in Arkansas and North Carolina.]

——. Malarial Fevers. Prevalence and Geographic Distribution in Arkansas.—*U.S. Public Health Rep.*, 1914. Jan. 2. Vol. 29. No. 1, pp. 1–13. With 2 maps.

——. Investigation of the Prevalence of Malarial Fevers in the United States Public Health Service.—*Jl. Amer. Med. Assoc.*, 1914. Feb. 7. Vol. 62. No. 6, pp. 438–439.

——. Malarial Fevers. Prevalence and Geographic Distribution in South Carolina, Georgia and Florida.—*U.S. Public Health Rep.*, 1914. Mar. 13. Vol. 29. No. 11, pp. 613–627. With 3 maps.

FRAGA (Clementino). Le Foie dans le Paludisme Chronique (Diagnostic Physique et Fonctionnel). *Trans. xvii. Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 135–145.

FRASSETTO (Augusto). Sulla Presenza di Autolisine Endo ed Extra-globulari nel Sangue dei Malarici.—*Malaria e Malat. d. Paesi Caldi*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 79–84.

FUCHS-WOLFRING (Sophie). Réveil du Paludisme à la Suite d'une Cure de Tuberculine.—*Rev. de la Tuberculose*, 1913. Dec. 2. ser. Vol. 10. No. 6, pp. 407–411. With 1 plate and 1 fig.

GENOVESE (Francesco). La Patologia del Lavoro (Malaria) fra gli Operai Agrumari in Calabria.—*Propaganda Antimalarica*, 1914. Feb. 28. Vol. 7. No. 1, pp. 19–22.

GIEMSA (G.). Ueber die weitere Vervollkommnung des Mückenspray-verfahrens (Konspersionsmethode). (Vorläufige Mitteilung.)—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 1. pp. 26–29.

GIEMSA (G.) & WERNER (H.). Erfahrungen mit weiteren dem Chinin nahestehenden Alkaloiden und einigen ihrer Derivate bei Malaria (Chinidin, Hydrochinidin, Cinchonin, Hydrocinchonin, Cuprein, Chinäthylin und Chinpropylin).—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 1, pp. 12–15.

GOODHART (S. Philip). Amnesias of Tobacco and of Malarial Origin. With Report of Two Cases.—*Amer. Jl. Med. Assoc.*, 1913. Dec. 27. Vol. 61. No. 26, pp. 2297–2301.

de HAAN (J.). Over het voorkomen van de Wassermann'sche Reactie bij Lijders aan Acute Malaria in de Tropen.—*Geneesk. Tijdschr. v. Nederl.-Indië*, 1913. Vol. 53. No. 6, pp. 737–757.

[Corresponds with the same author's paper published in German in the *Archiv f. Schiffs- u. Trop.-Hyg.*, 1913. Vol. 17. pp. 693–705, and reviewed in this *Bulletin* Vol. 2. p. 557.]

HEHIR (W.). Mosquito-Malaria Hypothesis: Another Link in the Chain of its History. [Correspondence.]—*Indian Med. Gaz.*, 1914. Feb. Vol. 49. No. 2, p. 79.

IBBA (Ferruccio). La Malaria nel Comune d'Iglesias durante il 1913.—*Propaganda Antimalarica*, 1913. Dec. 31. Vol. 6. No. 6, pp. 132–139.

IZAR (G.). & NICOSIA (R.). Ueber Chemotherapie bei Malaria.—*Berlin. klin. Wochenschr.* 1914. Mar. 2. Vol. 51. No. 9, pp. 385–391; Mar. 9. No. 10, pp. 453–457. With 30 curves.

JOUVEAU-DUBREUIL (H.). Note sur le Paludisme à Tchentou (Setchouen, Chine occidentale).—*Bull. Soc. Méd.-Chirurg. de l'Indochine*, 1914. Jan. Vol. 5. No. 1, pp. 32–37.

LAFONT & CADET. Paludisme et Fièvre jaune en Afrique Occidentale française. Etude de leurs Formules Leucocytaires et Comparaison avec celles de quelques autres Maladies.—*Ann. d'Hyg. et de Méd. Coloniales*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1068–1106.

LANGMEAD (Frederick). Case of Malaria in an Infant.—*Proc. Roy. Soc. Med.*, 1914. Feb. Vol. 7. No. 4. Section for the Study of Disease in Children, pp. 65–66.

[A record of straightforward benign tertian malaria in an Anglo-Indian girl of 3¾ years.]

LEGER (André). Le Paludisme dans le Haut-Sénégal et Niger. Index endémique de la Ville de Bamako.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 181–184.

——. Recherches au Laboratoire de Bamako (Soudan français), sur l'Index paludéen, l'Index filarien, la Tuberculose et la Trypanosomiase humaine.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 77–81.

MALISCH. Oeffentliches Sanitätswesen. Die Malaria im Südosten Deutschlands.—*Deut. Med. Wochenschr.*, 1914. Apr. 9. Vol. 40. No. 15, pp. 763–764.

MALOUVIER. Une Epidémie de Paludisme au Tonkin.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 745–752. With a map.

MARTELLI (Pier Nello). Sopra un Caso di Febbre intermittente simulante Malaria in una Bambina affetta da Cistite.—*Propaganda Antimalarica*, 1914. Feb. 28. Vol. 7. No. 1, pp. 15–18.

MATHIS. Considérations sur le Paludisme et la Filariose en Indochine. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 215–228.

Di MATTEI (Eugenio). La Malaria in Italia nei Lavoratori della Terra e nei Loro figli.—*Malaria e Malat. d. Paesi Caldi.*, 1913. Oct.–Dec. Vol. 4. No. 6–7–8, pp. 341–351.

[A popular address on the social status of the Italian and Sicilian field labourers together with the methods adopted by the Government authorities in the prevention of malaria in rural districts.]

MEREU (Francesco). Lavoro e Malaria nella Miniera Argentiera della Nurra.—*Malaria e Malat. d. Paesi Caldi.*, 1914. Feb. Vol. 5. No. 1, pp. 6–13.

[The silver-mine workers are especially liable to malaria; adult males are mostly affected, women and children also, but to a less degree. The subtertian parasite appears to be almost as numerous as the benign.]

NOCHT (B.). Bemerkung zu der Arbeit von Prof. Ziemann "Weiteres über die Züchtung der Malariaparasiten und der Piroplasmen in vitro" (Archiv für Schiffs- und Tropenhygiene, Bd. 18, Heft 3).—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol 18. No. 5, pp. 166–167.

O'CONNELL (Mathew D.). The Meteorology of Malaria.—*Jl. Trop. Med. & Hyg.*, 1914. Apr. 1. Vol. 17. No. 7, pp. 97–98.

[The author considers that the night atmospheric conditions at the island of Walcheren in August are such as to afford an explanation of the mild intermittent fevers which still linger there. [See this *Bulletin* Vol. 2, p. 545.]

PATTERSON (A. H.). Diabetes insipidus—complicating Malaria.—*China Med. Jl.*, 1914. Jan. Vol. 28. No. 1, pp. 18–19.

[A case of polyuria following a straightforward malarial attack, which yielded to quinine.]

PEIPER (Otto). Ueber Malariabehandlung mit Hydrochinin. Ueber Papatacifieber.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 221–232.

PÉLISSIER. Rupture de la Rate par Coup de Pied de Cheval chez un Paludéen. Epanchement hémorragique—Suppuration—Vomique—Mort, 62 jours après le Traumatisme initial. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 254–257.

[Rupture of a malarial spleen from the kick of a horse. The patient died 62 days afterwards. Apparently an infection of the effused blood had taken place. An operation proved unsuccessful.]

POPE (Curran). Chronic Malaria Cachexia and its Relation to Neurasthenoid Conditions.—*Boston Med. & Surg. Jl.*, 1914. Feb. 5. Vol. 170. No. 6, pp. 193–197.

RIEUX (J.). Note sur la Cytologie du Sang dans le Paludisme.—*Folia Haematologica*, (Archiv). 1914. Jan. Vol. 17. No. 4, pp. 419–428.

RODENWALDT. Immunität gegen Malaria bei Negern.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 263–254.

ROSS (Ronald). Malaria in Cyprus and Greece.—*Proc. Roy. Soc. Med.*, 1914. Mar. Vol. 7. No. 5 (Sect. of Epidemiology & State Med.), pp. 107–115.

——. Intramuscular Injections of Quinine. [Correspondence.]—*Lancet*, 1914. Apr. 4, pp. 1003–1004.

——, CHRISTOPHERS (S.R.) & PERRY (E. L.). The Spleen Rate in London School Children.—*Indian Jl. Med. Research*, 1914. Jan. Vol. 1. No. 3, pp. 385–387.

ROSSI (Giacomo). La Malaria nella Valle dell' Enza e l'Anofelismo senza Malaria.—*Propaganda Antimalarica*, 1914. Feb. 28. Vol. 7. No. 1, pp. 1–11. With 4 text figs.

RUGE (Reinhold). Schwierigkeiten bei der Chininprophylaxe.—*Propaganda Antimalarica*, 1913. Dec. 31. Vol. 6. No. 6, pp. 121–125.

SCHWYZER (Fritz) Erfahrungen über chronische Malaria —*Correspondenz-Blatt f. Schweizer Aerzte*, 1914. Mar. 7. Vol. 44. No. 10, pp. 294–305.

SÖRENSEN (N.). Die Urobilinsekretion im Harne bei Malaria, besonders beim Schwarzwasserfieber.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 5, pp. 159–163.

SPAGNOLIO (Giuseppe). Il Tannato di Chinino nella Malaria infantile.—*Malaria e Malat. d. Paesi Caldi*, 1913. Oct.–Dec. Vol. 4. No. 6–7–8, pp. 367–368.

STEPHENS (J. W. W.). A New Malaria Parasite of Man.—*Proc. Roy. Soc.*, 1914. Apr. 8. Vol. B. 87. No. B. 596, pp. 375–377. With 1 coloured and 2 black and white plates; and *Ann. Trop. Med. & Parasit*, 1914. Apr. 21. Vol. 8. No. 1, pp. 119–128. With 3 plates.

SULDEY (E. W.). Importance de la Formule leucocytaire dans le Diagnostic différentiel de l'Hépatite paludéenne et de l'Hépatite suppurée.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 71–77.

TARASCONI (Luigi). Profilassi antimalarica scolastica nell'Anno 1911 in Serramanna.—*Propaganda Antimalarica*, 1913. Dec. 31. Vol. 6. No. 6, pp. 139–141.

THOMSON (David). A Demonstration on the Cultivation of Malarial Parasites (*Plasmodium falciparum* and *Plasmodium vivax*).—*Trans. Soc. Trop. Med. & Hyg.*, 1914. Jan. Vol. 7. No. 3, p. 126.

[A demonstration of the author's well known work on the subject.]

TRESIDDER (A. G.). A Case of Malarial Coma lasting 46 hours: Recovery. —*Lancet*, 1914. Mar. 28, pp. 891–892. With 1 chart.

WATSON (Malcolm). The Prevention of Malaria.—*Glasgow Medical Jl.*, 1914. Feb. Vol. 81. No. 2, pp. 81–88.

WERNER (H.). Malariarückfälle nach Salvarsanbehandlung.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 2, pp. 63–64.

ZIEMANN (H.). Weiteres über die Züchtung der Malariaparasiten und der Piroplasmen (*Piroplasma canis*) in vitro.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Feb. Vol. 18. No. 3, pp. 77–93. With 1 curve.

——. Nachtrag zu "Weiteres über die Züchtung der Malariaparasiten und Piroplasmen usw." in Heft 3, 1914 des Archivs.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Feb. Vol. 18. No. 4, p. 132.

MYIASIS.

FRANCAVIGLIA (M. Condorelli). Myiasis auricolare per *Sarcophaga carnaria* (L.).—*Bollettino d. sedute d. Accademia Gioenia di Scienze Naturali in Catania*, 1913. Nov. Serie 2. No. 28, pp. 7–10.

RIELEY (S. D.) & HOWLETT (F. M.). A Few Observations on Myiasis (Screw-Worm Disease) in Behar. With a Note on the Fly.—*Indian Med. Gaz.*, 1914. Jan. Vol. 49. No. 1, pp. 8–10. With 1 temperature chart.

PAPPATACI FEVER.

CLARK (W. S.). Report on Cases resembling Pappataci Fever, observed at Ibadan, S. Nigeria.—*Yellow Fever Bureau Bull.*, 1914. Apr. 7. Vol. 3. No. 2, pp. 145–147.

PEIPER (Otto). Ueber Malariabehandlung mit Hydrochinin. Ueber Papatacifieber.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 221–232.

PELLAGRA.

ANTONINI (G.). Il più grande Studioso della Pellagra.—*Rivista Pellagrologica Italiana*, 1914. Mar. Vol. 14. No. 2, pp. 29–30.

ARNOLD (I. A.). Pellagra. (Report of Case.)—*Kentucky Med. Jl.*, 1914. Jan. 15. Vol. 12. No. 2, p.76.

[Report of case of suspected pellagra in Louisville.]

BULLETIN de l'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE, 1913. Dec. Vol. 5. No. 12, pp. 2137–2140. Autriche (Bukovine). Loi du 1er janvier 1911 sur les Mesures à Prendre pour Combattre la Pellagre, applicable dans le Duché de Bukovine.

CARBONE (Domenico) & CAZZAMALLI (Ferdinando). Studi sulla Eziologia della Pellagra. Nota Seconda.—*Giorn d. R. Soc. Italiana d'Igiene*, 1914. Jan. 31. Vol. 36. No. 1, pp. 1–14; Feb. 28. No. 2, pp. 51–63.

CESA-BIANCHI (D.). Osservazioni Cliniche e Ricerche Sperimentali sulla Pellagra.—*Clinica Medica Italiana*, 1914. Jan. Vol. 53. No. 1, pp. 35–58. With 12 figs.; and Feb. No. 2, pp. 69–97.

CONNOR (R. C.). Three Cases of Pellagra.—*Proc. Canal Zone Med. Assoc. (Isthmian Canal Commission) for the Half Year Oct.* 1911 *to March* 1912. Vol. 4. Part 2, pp. 16–17.

DEEKS (W. E.). Four Cases of Pellagra.—*Proc. Canal Zone Med. Assoc. (Isthmian Canal Commission) for the Half Year Oct.* 1911 *to March* 1912. Vol. 4. Part 2, pp. 55–56.

FRANCHETTI (Augusto). Ricerche intorno alla Pellagra nei Bambini.—*Rivista Pellagrologica Italiana*, 1914. March. Vol. 14. No. 2, pp. 22–27.

FUNK (Casimir). Prophylaxe und Therapie der Pellagra im Lichte der Vitaminlehre.—*München. Med. Wochenschr.*, 1914. Mar. 31. Vol. 61. No. 13, pp. 698–699.

GEHRING (Edwin W.). Pellagra in Maine.—*New York Med. Jl.*, 1913. Dec. 20. Vol. 98. No. 25. [Whole No. 1829.], pp. 1212–1213.

[This replaces the reference in the previous list which erroneously cited Gehring's paper as from the *Jl. Amer. Med. Assoc.*]

HARRING (E. R.). Pellagra.—*New Orleans Med. & Surg. Jl.*, 1914. Mar. Vol. 66. No. 9, pp. 673–677.

HILL (R. B.). A Possible Relationship of Bacilli of the Colon Group to Pellagra; with Report of Two Cases.—*Proc. Canal Zone (Isthmian Canal Commission) for the Half Year Oct.* 1911 *to March*, 1912. Vol. 4. Part 2, pp. 98–101.

HUZAR (W.). Aetiologie der Pellagra im Lichte neuerer Forschungen.—*Wien. Med. Wochenschr.*, 1914. Feb. 7. Vol. 64. No. 6, pp. 217–224.

[A general discussion of the etiology of pellagra in the light of our present knowledge of the disease. All the chief theories are carefully considered and a useful bibliography of the literature is given.]

LOFTEN (Lucien). The Cause of Pellagra (Preliminary Report).—*Internat. Jl. of Surgery*, 1913. Aug. Vol. 26. No. 8, pp. 289–290.

NIGHTINGALE (P. A.). Zeism or Pellagra?—*Brit. Med. Jl.*, 1914. Feb. 7, pp. 300–302.

NILES (George M.). The Treatment of Pellagra. An Optimistic Survey of its Present Status.—*Jl. Amer. Med. Assoc.*, 1914. Jan. 24. Vol. 62. No. 4, pp. 285–287.

PEREZ (George V.). Pellagra. [Correspondence.]—*Brit. Med. Jl.*, 1914. Mar. 14, p. 624.

RAYER (P.). Pellagra. [Translated by R. Willis from Rayer's Atlas of Skin Diseases, 1835.]—*New Orleans Med. & Surg. Jl.*, 1914. Apr. Vol. 66. No. 10, pp. 718–730.

RONDONI (Pietro). Sulla Ipersensibilità delle Cavie Maidizzate di Fronte al Siero di Sangue dei Pellagrosi, con Considerazioni sulla Genesi della Pellagra.—*Riv. Pellagrologica Italiana*, 1914. Jan. Vol. 14. No. 1, pp. 6–8; and Mar. No. 2, pp. 27–29.

RUBINATO (Giovanni). Alcuni Casi di Pellagra con Sindrome Addisoniana.—*Riv. Crit. di Clin. Med.*, 1914. Jan. 31. Vol. 15. No. 5, pp. 65–74.

SILER (J. F.), GARRISON (P. E.) & MACNEAL (W. J.). With the Collaboration of A. H. Jennings, W. V. King, V. C. Myres, M. S. Fine, O. S. Hillman and others. Pellagra. First Progress Report of the Thompson-McFadden Pellagra Commission of the New York Post-Graduate Medical School and Hospital.—iv.+148 pp. [1914.]

——, —— & ——. Pellagra. A Summary of the First Progress Report of the Thompson-McFadden Pellagra Commission.—*Jl. Amer. Med. Assoc.*, 1914. Jan. 3. Vol. 62. No. 1, pp. 8–12.

STEFANO. Le Scuole d'Igiene e di Educazione Domestica nella Lotta contro la Pellagra.—*Rivista Pellagrologica Italiana*, 1914. Mar. Vol. 14. No. 2, pp. 18–22.

Stewart (Chas. E.). The Probable Identity of Pellagra and Sprue.—*Trans. xvii. Intern. Congress of Med. London*, 1913. Section xxi. Trop. Med. and Hyg. Part 2, pp. 125–132.

Tizzoni (Guido) & De Angelis (G.). Caratteri principali della Streptobacillus Pellagrae da Servire di Guida per la sua Identificazione.—*Malaria e Malat. d. Paesi Caldi*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 85–90.

Volpi-Ghirardini (Gino) & Zuccari (Giuseppe). Sulla Ipersensibilità delle Cavie as Alimentazione Maidica per il Siero di Sangue di Pellagroso. Ricerche Sperimentali.—*Riv. Pellagrologica Italiana*, 1914. Jan. Vol. 14. No. 1, pp. 9–11.

Volpino (G.). Il Monofagismo ed i suoi Rapporti con le Malattie popolari della Pellagra, dello Scorbuto e del Beri-beri.—*Rivista Pellagrologica Italiana*, 1914. Mar. Vol. 14. No. 2, pp. 17–18.

——. Sulla Presenza di Sostanze Protettrici nella Cariosside di Grano-Turco e sulla Reazione di Ipersensibilità dei Pellagrosi.—*Pathologica*, 1914. Mar. 15. Vol. 6. No. 129, pp. 147–148.

Wilson (S. A. Kinnier). The Pathology of Pellagra.—*Proc. Roy. Soc. Med.*, 1914. Feb. Vol. 7. No. 4. Neurological Section, pp. 32–41.

PLAGUE.

Arnould. Epidémie de Peste de Phu-Luu (Province de Bac-Ninh), pendant le 1er Trimestre de 1913.—*Ann. d'Hyg. et Méd. Coloniales*, 1913. Oct.-Nov.-Dec. Vol. 16. No. 4, pp. 936–945.

Bacot (A. W.). A Study of the Bionomics of the Common Rat Fleas and other Species associated with Human Habitations, with Special Reference to the Influence of Temperature and Humidity at Various Periods of the Life History of the Insect.—*Jl. of Hygiene.* Plague Supplement iii., 1914. Jan. 14. pp. 447–654. With 8 plates, 12 charts and 3 text figs.

——. On the Survival of Bacteria in the Alimentary Canal of Fleas during Metamorphosis from Larva to Adult.—*Jl. of Hygiene.* Plague Supplement iii. 1914. Jan. 14 pp. 655–664.

——. The Effect of the Vapours of Various Insecticides upon Fleas (*Ceratophyllus fasciatus* and *Xenopsylla cheopis*) at each stage in their Life-History and upon the Bed Bug (*Cimex lectularius*) in its Larval Stage.—*Jl. of Hygiene.* Plague Supplement iii., 1914. Jan. 14. pp. 665–681. With 1 text fig.

——. & Martin (C. J.). Observations on the Mechanism of the Transmission of Plague by Fleas.—*Jl. of Hygiene.* Plague Supplement iii, 1914. Jan. 14, pp. 423–439. With 3 plates and 4 text figs.; and *Trans. xvii Internat. Congress of Med.*, London, 1913. Sect. xxi, Trop. Med. and Hyg. Part 2, pp. 9–17.

de Beaufort (L. F.). Bericht über eine Untersuchung einiger, in 1911 von Dr. J. J. Van Loghem auf Java gesammelten Ratten.—*Mededeelingen van d. Burgerlijken Geneeskund. Dienst in Nederl.-Indie*, 1913. Vol. 2. No. 2, pp. 5–14.

Béros & Bocquillon. Epidémie de Peste de Nérin et de Gondé (Nouvelle-Calédonie, 1912–1913).—*Ann. d'Hyg. et Méd. Coloniales*, 1913. Oct.-Nov.-Dec. Vol. 16. No. 4, pp. 927–931.

Brooks (Ralph St. John). The Influence of the Medium in which the Plague Bacillus is propagated upon the Facility with which it is Ingested by Human Leucocytes.—*Jl. of Hygiene.* Plague Supplement iii, 1914. Jan. 14, pp. 412–417.

Browning-Smith (S.). The Annual Reappearance of Plague.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 17–47. With 3 Maps. 1913. Simla: Govt. Central Branch Press.

——. A Simple Method of Rat Destruction.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 70–71, 1913. Simla: Govt. Central Branch Press.

Burger (H.). Pestdokters gevraagd!—*Nederlandsch Tijdschr. v. Geneeskunde*, 1914. Mar. 14. 1. Helft. No. 11, pp. 781–784.

Castellani (Aldo) & Philip (Marshall). Plague in Ceylon.—*Brit. Med. Jl.*, 1914. Apr. 4. pp. 752–753.

Collin. Epidémie de Peste en Nouvelle-Calédonie en 1912. Epidémiologie et Prophylaxie.—*Ann. d'Hyg. et Méd. Coloniales*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 910–927.

Collin (Léon). Petite Epidémie de Peste en Nouvelle-Calédonie. Considerations étiologiques et diagnostiques.—*Bull. Soc. Path. Exot.* 1913. Dec. Vol. 6. No. 10, pp. 660–663.

Connor (R. C.). Atypical Forms of Plague.—*Proc. Canal Zone Med. Assoc. (Isthmian Canal Commission) for the Half Year Oct.* 1911 *to March* 1912. Vol. 4. Part 2, pp. 60–63.

Darling (S. T.). Observations on the Laboratory Diagnosis of Plague.—*Proc. Canal Zone Med. Assoc. (Isthmian Canal Commission) for the Half Year Oct.* 1911 *to March* 1912. Vol. 4. Part 2, pp. 68–75.

Doucet. Epidémie de Peste en Nouvelle-Calédonie en 1912.—*Ann. d'Hyg. et Méd. Coloniales.* 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 891–901.

Fargier. Epidémie de Peste au Cap Saint-Jaques (Septembre à Décembre, 1911).—*Ann. d'Hyg. et Méd. Coloniales*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 931–936.

Gehringer (G. M.). An Atypical Case of Plague.—*Proc. Canal Zone Med. Assoc. (Itshmian Canal Commission) for the Half Year Oct.* 1911 *to March*, 1912. Vol. 4. Part 2, pp. 64–67.

Gioseffi (M.). Zur Pestprophylaxe im Seehafen von Triest.—*Wien. Klin. Wochenschr.*, 1914. Mar. 5. Vol. 27. No. 10, pp. 241–242.

Grubbs (S. B.). The Plague Outbreak in Porto Rico.—*Jl. Amer. Med. Assoc.*, 1914. Jan. 24. Vol. 62. No. 4, pp. 288–289.

Hirst (L. Fabian). Identification of Rat-Fleas in Colombo. [Memoranda.]—*Brit. Med. Jl.*, 1914. Jan. 10, p. 85.

Ilvento (Arcangelo) & Mazzitelli (Michele). Esistenza del Bacillo Pestoso nell'Organismo senza Sintomi clinici.—*Riforma Medica*, 1914. Mar. 28. Vol. 30. No. 13, p. 348.

Kunhardt (J. C. G.). The Importance of the Persistence of Plague Infection in Certain Villages during the Off-Season.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 48–61. With 3 charts. 1913. Simla: Govt. Central Branch Press.

Leboeuf. Epidémie de Peste en Nouvelle-Calédonie en 1912. Travaux de Laboratoire.—*Ann. d'Hyg. et Méd. Coloniales*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 901–910.

Liston (W. Glen). Plague Preventive Measures.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 100–105, 1913. Simla: Govt. Central Branch Press.

Low (R. Bruce). Report on the Progress and Diffusion of Plague throughout the World during the two Years 1911 and 1912.—*Forty-Second Ann. Report of the Local Govt. Board*, 1912–13.—Supplement containing Report of Medical Officer for 1912–13. Appendix A. No. 1, pp. 1–88. 1914. London: Printed under the Authority of H. M. Stationery Office. [Cd. 7181.]

MARKL. Kasuistischer Beitrag zur Rattenpest.—*Centralbl. f. Bakt.* I. Abt. Orig., 1914. Feb. 25. Vol. 73. No. 2, pp. 135–136.

DE RAADT (O. L. E.). Beitrag zur Kenntnis der Unterschiedsmerkmale zwischen javanischen Haus- und Feldratten in Beziehung zu der Epidemiologie der Pest auf Java.—*Mededeelingen van d. Burgelijken Geneeskund. Dienst in Nederl.-Indië*, 1913. Vol. 2. No. 2, pp. 32–37. With 1 plate.

——. Bijdrage tot de Kennis der Onderscheidskenmerken tusschen Javaansche Huis- en Veldratten met Betrekking tot de Epidemiologie der Pest op Java.—*Geneeskund. Tijdschr. v. Nederl.-Indië*, 1914. Vol. 54. No. 1, pp. 31–37. With 3 plates.

——. Pestbestrijding te Shanghai en Pestbestrijding op Java.—*Geneeskund. Tijdschr. v. Nederl.-Ind.*, 1914. Vol. 54. No. 1, pp. 66–72.

ROSS (H.). A Note on the Fleas infesting the *Mus rattus* in Naini Tal and Mussoorie.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 88–89. 1913. Simla: Govt. Central Branch Press.

——. (W. C.). The Prevention of Plague.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 90–92. 1913. Simla: Govt. Central Branch Press.

ROW (R.). Curative Value of a "Glycerinated Pest Vaccine" in Plague.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 49–51.

ROWLAND (Sydney). The Influence of Cultivation in Serum-Containing Media upon the Virulence and Immunising Properties of the Plague Bacillus.—*Jl. of Hygiene.* Plague Supplement iii. 1914. Jan. 14, pp. 403–411. With 1 plate.

——. The Morphology of the Plague Bacillus.—*Jl. of Hygiene.* Plague Supplement iii. 1914. Jan. 14, pp. 418–422. With 7 plates.

——. Influence of the Medium in which B. *pestis* is propagated upon its Virulence.—*Jl. of Hygiene.* Plague Supplement iii. 1914. Jan. 14, pp. 440–446.

SANQUIRICO. Note concernant la Transmission de la Peste par les Rats.—*Rev. de Méd. et Hyg. Tropicales*, 1913. Vol. 10. No. 3, pp. 133–134.

STEVENSON (W. D. H.). The Absence of a "Negative Phase" after Inoculation with Plague Prophylactic.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 94–99. 1913. Simla: Govt. Central Branch Press.

STRICKLAND (C.). The Biology of *Ceratophyllus fasciatus* Bosc., the Common Rat-Flea of Great Britain.—*Forty-Second Ann. Report of the Local Govt. Board*, 1912–13. Supplement containing Report of Medical Officer for 1912–13. Appendix B. No. 5, pp. 401–412. 1914. London: Printed under the Authority of H.M. Stationery Office. [Cd. 7181.]

SWELLENGREBEL (N. H.). Een Tweede Geval van Ratpest op een Schip in de Haven van Amsterdam.—*Nederl. Tijdschr. v. Geneeskunde*, 1914. Feb. 7. I. Helfte. No. 6, pp. 393–396.

——, & OTTEN (L.). Ueber "mitigierte" Pestinfektion bei Ratten und Meerschweinchen.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 5, pp. 149–159.

TAYLOR (J.). Plague in the Madras Presidency.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 80–87. 1913. Simla: Govt. Central Branch Press.

TURKHUD (D. A.). Defective Registration of Plague Deaths, an Explanation for the Reappearance of Plague without Evidence of Importation of Infection.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 62–68. 1913. Simla: Govt. Central Branch Press.

U. S. PUBLIC HEALTH REPORTS, 1914. Mar. 20. Vol. 29. No. 12, pp. 675–676. Plague in Cuba.

De Vogel (W. Th.). Extract from the Report to the Government on the Plague Epidemic in Malang (Isle of Java), November 1910 till August 1912.—*Mededeelingen van den Burgerlijken Geneeskund. Dienst in Nederl.-Indië*, 1913. Vol. 1a, pp. 30–111. With 43 figs. 12 charts and 54 maps.

White (F. Norman). Grain and the Grain Trade as Factors in the Persistence and Dissemination of Plague in India.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 72–79. 1913. Simla: Govt. Central Branch Press.

——. Variations in the Sex Ratio of *Mus rattus* Associated with an Unusual Mortality of Adult Females.—*Proc. Roy. Soc.*, 1914. Apr. 8. Vol. B 87. No. B 596, pp. 335–344.

Wu Lien Teh (G. L. Tuck). Investigations into the Relationship of the Tarbagan (Mongolian Marmot) to Plague.—*Trans. xvii. Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 19–48.

RELAPSING FEVER (and Spirochaetosis).

Armstrong (E. R.). Two Cases of Relapsing Fever. [Correspondence.]—*Indian Med. Gaz.*, 1914. Feb. Vol. 49. No. 2, p. 79.

Arnheim (G.). Spirochätenuntersuchungen.—*Zeitschr. f. Hyg. u. Infektionskr.*, 1914. Jan. 15. Vol. 76. No. 3, pp. 407–442. With 2 plates.

Balfour (Andrew). Notes on the Life-Cycle of the Sudan Fowl Spirochaete.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 275–278.

Blanchard (M.). Epidémie de Fièvre récurrente à Bikié (Congo français).—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 81–86.

Conseil (E.). Le Galyl et le Ludyl dans le Traitement de la Fièvre récurrente.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 101–105.

Duvigneau. Fièvre récurrente au Tonkin en 1912. Epidémiologie et Prophylaxie.—*Ann. d'Hyg. et Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 849–891.

Galli-Valerio (B.). Recherche sur la Spirochétiase des Poules de Tunisie et sur son Agent de Transmission: *Argas persicus* Fischer. 3e Mémoire.—*Centralbl. f. Bakt.*, I. Abt. Orig., 1914. Jan. 24. Vol. 72. No. 6/7, pp. 526–528.

Gonder (Richard). Experimentelle Studien über *Spironema gallinarum* und *Spironema recurrentis*.—*Zeitschr. f. Immunitätsforsch. u. Experim. Therapie.* I. Teil. Orig., 1914. Mar. 14. Vol. 21. No. 1/5, pp. 309–325.

Hata (S.). A Contribution to our Knowledge of the Cultivation of *Spirochaeta recurrentis*.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 269–273.

Launoy (L.) & Lévy Bruhl (M.). Evolution de la Spirillose chez la Poule, après Splénectome.—*Compt. Rend Soc. Biol.*, 1914. Feb. 27. Vol. 76, No. 7, pp. 298–299.

Mayer (Martin). Uebertragung von *Spirochaeta gallinarum* durch Milben.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 254–255.

Meirowsky (E.). Protozoischer oder pflanzlicher Entwicklungskreis der Spirochäten?—*Dermatol. Wochenschr.*, 1914. Feb. 21. Vol. 58. No. 8, pp. 225–232. With 1 plate.

——. Untersuchungen über die Stellung der Spirochäten im System.—*München. Med. Wochenschr.*, 1914. Mar. 17. Vol. 61. No. 11, pp. 592–596. With 1 fig. and 1 plate.

Mouneyrat, Tanon & Dupont. Action spirillicide du Galyl et du Ludyl. —*Rev. de Méd. et Hyg. Tropicales*, 1913. Vol. 10. No. 4, pp. 202–204.

Neiva (Arthur). Modo de Comportar-se do *Treponema gallinarum* em Temperaturas baixas. (Nota prévia.)—*Brazil Medico*, 1914. Jan. 1. Vol. 28. No. 1, pp. 1–2.

Neufeld (E.) & Böcker (E.). Ueber die Wirkung von Salvarsan auf Huhnerspirochäten in vivo und in vitro.—*Zeitschr. f. Immunitatsforsch. u. Experim. Therapie.* 1. Teil. Orig., 1914. Mar. 14. Vol. 21. No. 1/5, pp. 331–341.

Perthuisot. Note sur la Fièvre récurrente en Indochine et particulièrement à Than-Hoa en 1913.—*Bull. Soc. Méd.-Chirurg. de l'Indochine*, 1914. Jan. Vol. 5. No. 1, pp. 18–31.

Primet. L'Emploi au Tonkin des Arsénicaux dans le Traitement et la Prophylaxie de la Fièvre Récurrente.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 283–285.

Sergent (Edm.) & Foley (H.). Transmission de la Fièvre récurrente par Dépot sur les Muqueuses intactes du Produit de Broyage de Poux prélevés sur un Spirillaire.—*Compt. Rend. Soc. Biol.*, 1914. Mar. 27. Vol. 76. No. 11, pp. 471–472.

Stefansky (V.). Sur le Problème de l'Infection par la Fièvre récurrente.—*Roussky Vratch.*, 1913. No. 40, p. 1386. [Summarised in *Bull. de l'Office Intern. d'Hyg. Publique*, 1914. Feb. Vol. 6. No. 2, p. 361.]

Todd (J. L.) & Wolbach (S. B.). Concerning the Filterability of *Spirochaeta duttoni*.—*Jl. of Medical Research*, 1914. Mar. Vol. 30. No. 1. (New Ser. Vol. 25). Whole No. 143, pp. 27–36.

Wolbach (S. B.). The Distribution and Morphology of *Spirocheta duttoni* and *Spirochaeta kochi* in Experimentally Infected Ticks (*Ornithodorus moubata*).—*Jl. of Med. Research*, 1914. Mar. Vol. 30. No. 1. (New Ser. Vol. 25). Whole No. 143, pp. 37–48. With 3 plates.

—— & Binger (C. A. L.). The Cultivation of a Free-living Filterable Spirochete (*Spirochaeta elusa ;* new species). A Preliminary Report. —*Jl. of Med. Research*, 1914. Mar. Vol. 30. No. 1. (New Ser. Vol. 25). Whole No. 143, pp. 9–22. With 3 plates.

—— & ——. Notes on a Filterable Spirochete from Fresh Water (*Spirochaeta biflexa ;* new species).—*Jl. of Med. Research*, 1914. Mar. Vol. 30. No. 1. (New Ser. Vol. 25). Whole No. 143, pp. 23–25. With 1 plate.

SKIN, TROPICAL DISEASES OF THE.

Bernard (P. Noël). Recherches sur la Pathogénie de l'Ulcère phagédénique des Pays Chauds.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 176–179.

Castellani (Aldo). Tinea imbricata (Tokelau).—*Brit. Jl. of Dermatology*, 1913. Dec. Vol. 25. No. 12. (No. 302), pp. 377–401. With 26 figs. and 1 coloured plate.

Culpepper (Wm. Louis). A Case of Dhobie Itch (Tinea cruris). With Notes on the Thermal Deathpoint, Gross and Microscopical Drawings of the Causal Fungus (*Epidermophyton rubrum*).—*Amer. Jl. Trop. Dis. & Prevent. Med.*, 1914. Feb. Vol. 1. No. 8, pp. 584–587. With 1 plate and 1 text fig.

Gorga (José). Esporotrichose.—*Revista Med. de S. Paulo*, 1914. Jan. 15. Vol. 17. No. 1, pp. 4–11. With 4 text figs.

Gougerot & Voillemot. A propos d'un Cas de Craw-craw : Traitement par l'Hectine et le Permanganate de Potasse.—*Bull. de la Soc. Francaise de Dermatol. et Syph.*, 1914. Jan. Vol. 25. No. 1, pp. 22–27.

HEYMANN. Traitement par les Rayons X des Ulcères phagédéniques tropicaux.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 87–96.

HORNSEY (John F.). Dermatitis Venenata due to Rungus.—*Brit. Med. Jl.*, 1914. Apr. 4. No. 2779, pp. 759–760.

JOYEUX (Charles). Contribution à l'Etude des Teignes Africaines. *Trichophyton Soudanense.*—*Arch. de Parasit.*, 1914. Mar. Vol. 16. No. 3, pp. 449–460. With 6 text figs.

LOISELET. Acanthosis nigricans. Un cas vu à Madagascar.—*Rev. d. Méd. et Hyg. Tropicales*, 1913. Vol. 10. No. 4, pp. 204–205. With 2 plates.

MONTGOMERY (Douglass W.) & CULVER (George D.). Eczema marginatum of the Toes.—*Jl. Amer. Med. Assoc.*, 1914. Apr. 4. Vol. 62. No. 14, pp. 1076–1078.

De NAPOLI (Ferdinando). L'Opera del Medico in Libia a proposito delle Malattie Venereo-sifilitiche e Cutanee predominanti nell'Oasi di Tripoli e sue Dipendenze.—*Giorn. d. Med. Militare*, 1914. Feb. 28. Vol. 62. No. 2, pp. 94–124.

PINOY (E.). Un Traitement des Mycétomes.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 710–711.

SIMPSON (Frank Edward). Radium in the Treatment of Blastomycosis. With Report of a Case.—*Jl. Amer. Med. Assoc.*, 1914. Mar. 14. Vol. 62. No. 11, pp. 844–845. With 4 text figs.

WHYTE (G. Duncan). An Undescribed Form of Ulcer met with in the Tropics, with Observations on its Treatment (based on the Study of Eleven Cases).—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 83–85.

SLEEPING SICKNESS (and other Trypanosomiases).

D'ALMEIDA (Thiago). Sezonismo—Syphilis—Trypanosomiase, (Excerpto de Lição).—*Med. Contemporanea*, 1914. Mar. 8. Vol. 32. No. 10, pp. 75–79.

ANNALES D'HYGIENE ET DE MÉDECINE COLONIALES, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 262–264. Un Cas de Trypanosomiase contractée au Congo, observé à Nouméa (Nouvelle-Calédonie). Violentes Réactions à la Suite d'Injections intraveineuses d'Emétique. Extrait du Rapport annuel de la Direction du Service de Santé du Groupe du Pacifique. [Clinique d'Outre-Mer.]

AUSTEN (Ernest E.). A Dipterous Parasite of *Glossina morsitans.*—*Bull. Entomol. Research*, 1914. Apr. Vol. 5. Part 1, pp. 91–93. With 1 text fig.

BAYMA (Theodoro). Molestia de Carlos Chagas. (Nota sobre sua verificação parasitologica no homem, em S. Paulo).—*Revista Med. de S. Paulo*, 1914. Jan. 15. Vol. 17. No. 1, p. 3.

BECK (Max) Untersuchungen über ein am Rovuma (Deutschostafrika) vorkommendes Trypanosoma beim Menschen.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1914. Feb. Vol. 18. No. 3, pp. 97–101. With 1 plate.

BRAUN (H.). Ueber die tierischen Trypanosomenkrankheiten Deutsch-Ostafrikas.—*Berlin. Klin. Wochenschr*, 1914. Feb. 16. Vol. 51. No. 7, pp. 297–299.

——. & TEICHMANN (E.). Erfahrungen über die tierischen Trypanosomenkrankheiten Deutsch-Ostafrikas.—*Beihefte z. Arch. f. Schiffs- u. Tropenhygiene*, 1914. Jan. Vol. 18. Beiheft 1, pp. 5–39. With 2 text figs, and 1 coloured plate.

BRIEGER (L.) & KRAUSE (M.). Neues über Tryposafrol und Novotryposafrol.—*Berlin. Klin. Wochenschr*, 1914. Jan. 19. Vol. 51. No. 3, pp. 101–103.

BROWN (Wade H.). A Note on the Pathogenicity of *Trypanosoma lewisi*.—*Jl. Experim. Med.*, 1914. Apr. 1. Vol. 19. No. 4, pp. 406–410.

BRUMPT (E.). Réduvides de l'Amérique du Nord capables de transmettre le *Tryp. cruzi*.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 132–133.

CHATARD (J. A.) & GUTHRIE (C. G.). Human Trypanosomiasis: Report of a Case observed in Baltimore.—*Amer. Jl. Trop. Diseases & Preventive Medicine*, 1914. Jan. Vol. 1. No. 7, pp. 493-503. With 1 plate.

CIUCA (A.). Action des Abcès de Fixation sur la Trypanosomiase expérimentale du Cobaye et sur son Traitement par l'Atoxyl.—*Ann. Inst. Pasteur*, 1914. Jan. Vol. 28. No. 1, pp. 6–20.

COHN (Julie). Chemotherapeutische Untersuchungen über die Wirkung von China-Alkaloiden.—*Zeitschr. f. Immunitats. u. Exper. Therapie*, 1913. Vol. 18. July 17. No. 5, pp. 570–590. With 14 text figs.

DANYSZ (J.). Traitement du Surra par les Composés arsénicaux et Arséno-argentiques. Rapports entre les Doses tolérées et les Doses curatives.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No 3, pp. 200–202.

——. Essais de Chimiothérapie. Combinaisons des Sels d'Argent et des Composés Arsenicaux dans le Traitement des Trypanosomiases Expérimentales et de la Syphilis chez l'Homme.—*Ann. Inst. Pasteur*, 1914. Mar. Vol. 28. No. 3, pp. 238-256.

DARLING (S. T.). Note on the Infection of Mules by *Tr. hippicum* through Mucous Membrane.—*Proc. Canal Zone Med. Assoc. (Isthmian Canal Commission) for the Half Year Oct.* 1911 *to March*, 1912. Vol. 4. Part 2, p. 106.

DELANOË (P.). Des Variations du Pouvoir Infectieux et de la Virulence du *Trypan. dimorphon*, à partir d'Infections naturelles présentées par les Boeufs et les Moutons. Note Preliminaire.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 58–63.

——. Le Fonctionnement du Service de Prophylaxie à Bouaké (Côte d'Ivoire) à l'Egard des Trypanosomiases animales, du 10 juin au 31 déc. 1913—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 152–160. With a map.

DUKE (H. Lyndhurst). Wild Game as a Trypanosome Reservoir in the Uganda Protectorate: with some Criticisms on the Current Methods of Diagnosing these Protozoa.—*Arch. f. Protistenkunde*, 1914. Jan. 6. Vol. 32. No. 3, pp. 393–406.

——. Wild Game as a Reservoir for Human Trypanosomes. An Analysis of the Available Evidence from the Northern Shores of Lake Victoria Nyanza.—*Brit. Med. Jl.*, 1914. Feb. 7. pp. 289-292.

HAGEMEISTER (Wolfgang). Ueber die Züchtung pathogener Trypanosomen auf künstlichen Nährböden.—*Zeitschr. f. Hyg. u. Infektionskr.*, 1914. Apr. 1. Vol. 77. No. 2, pp. 227–256.

HALBERSTAEDTER (L.). Zur Chemotherapie der experimentellen Trypanosomeninfektion. (Berlin. mikrobiologische Gesellschaft, 1913. Feb. 6.)—*Berlin. Klin. Wochenschr*, 1913. Vol. 50. No. 9. p. 418.

——. Experimentelle Untersuchungen an Trypanosomen über die biologische Strahlenwirkung.—*Berl. Klin. Wochenschr.*, 1914. Feb. 9. Vol. 51. No. 6, pp. 252–253.

HECKENROTH (F.) & BLANCHARD (M.) Etat des Méninges et Injections intra-rachidiennes de Néosalvarsan dans la Trypanosomiase humaine.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1 pp. 63–68.

v. d. HELLEN. Versuche zur Behandlung von Schlafkranken mit Trixidin.—*Deut. Med. Wochenschr.*, 1914. Feb. 19. Vol. 40. No. 8, pp. 388–390.

HENNINGFELD (Fr.). Ueber die Isolierung einzelner Trypanosomen.—*Centralbl. f. Bakt.*, 1. Abt. Orig., 1914. Mar. 21. Vol. 73. No. 3, pp. 228–240.

INMAN (W. S.). Case of Irido-cyclitis occurring as an early Symptom of Trypanosomiasis (*Trypanosoma gambiense*).—*Proc. Roy. Soc. Med.*, 1914. Mar. Vol. 7. No. 5. Sect. of Opthalmology, pp. 72–73.

KERR (T. S.). A Human Recovery from Trypanosomiasis.—*Jl. Trop. Med. & Hyg.*, 1914. Mar. 16. Vol. 17. No. 6, pp. 81–83. With 2 charts.

KLEINE (F. K.). Zur angeblichen Identität des *Tr. brucei* und *Tr. rhodesiense*.—*Zeitschr. f. Hyg. u. Infektionskr*, 1914. Mar. 5. Vol. 77. No. 1, pp. 184–187.

KOLLE (W.), HARTOCH (O.) & SCHUERMANN (W.). Chemotherapeutische Experimentalstudien bei Trypanosomeninfektionen. ii. Mitteilung.—*Zeitschr. f. Immunitätsforsch. u. experim. Therapie.* 1. Teil. Orig., 1914. Jan. 22. Vol. 20. No. 5, pp. 436-475.

——. & ——. Weitere Mitteilungen über chemotherapeutische Experimentalstudien bei Trypanosomeninfektionen.—*Deut. Med. Wochenschr.*, 1914. Jan. 29. Vol. 40. No. 5, pp. 212–214.

KOPKE (Ayres). Traitement de Quelques Cas de Trypanosomiase Humaine par le Salvarsan et le Néosalvarsan.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. and Hyg. Part 2, pp. 195–200.

LAFONT (A.) and DUPONT (V.). Traitement de la Trypanosomiase humaine au Sénégal par le Ludyl et le Galyl.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 160–171.

LAVERAN (A.). Trypanotoxines. Essais d'Immunisation contre les Trypanosomes.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 693–698.

——. & MARULLAZ (M.). Essais d'Immunisation contre le Nagana expérimental des Souris.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 53–58.

LEGER. Recherches au Laboratoire de Bamako (Soudan français), sur l'Index paludéen, l'Index filarien, la Tuberculose et la Trypanosomiase humaine.—*Ann. d'Hyg. et Méd. Colon.* 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 77–81.

LEVADITI (C.) & MUTERMILCH (St.). Recherches sur la Production des Anticorps chez les Animaux trypanosomiés et traités par le Salvarsan.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 699–704.

LLOYD (Ll.). Further Notes on the Bionomics of *Glossina morsitans* in Northern Rhodesia.—*Bull. Entomol. Research*, 1914. Apr. Vol. 5. Part 1, pp. 49–60. With 4 plates and a Map.

LUNDIE (Alexander). The Detection of Trypanosomes in Animals.—*Jl. Trop. Med. & Hyg.*, 1914. Jan. 15. Vol. 17. No. 2, p. 22.

LURZ (R.). Versuche mit dem Trypanosomenheilmittel "Trixidin" bei schlafkranken Menschen.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 6, pp. 212–213.

MACKIE (F. P.). A Summary of the Work done by the Sleeping Sickness Commission, 1908–1910.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 126–148. 1913. Simla: Govt. Central Branch Press.

[A short account of the present state of our knowledge of sleeping sickness, with special reference to the work of the Sleeping Sickness Commission of the Royal Society, 1908–1910. The Commission's reports have been summarised in this and the *Sleeping Sickness Bulletin*.]

MAY (A.). Report on Sleeping Sickness in Northern Rhodesia to December, 1913. 29 pp. The British South Africa Company, Administration of Northern Rhodesia.

MESNIL (Félix). Sur le Nagana de l'Ouganda.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 685–689.

——. & BLANCHARD (M.). Sur l'Identification du Virus d'un Cas de Trypanosomiase humaine contractée au Laboratoire. Note préliminaire.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 196–200.

MITZMAIN (M. Bruin). The Mechanical Transmission of Surra by *Tabanus striatus*.—*Philippine Islands Dept. of Public Instruction Bureau of Agriculture.* Bulletin No. 28. 1913. 11 pp.

MOHLER (John R.), EICHHORN (Adolph) & BUCK (John M.). The Diagnosis of Dourine by Complement Fixation.—*Jl. Agricultural Research*, Dept. of Agriculture, Washington, 1913. Nov. 10. Vol. 1. No. 2, pp. 99–107.

MOLDOVAN (J.). Ueber die Wirkungsart des Atoxyls, Salvarsans und des Menschenserums bei der experimentellen Naganainfektion.—*Zeitschr. f. Immunitatsforsch. u. Experim. Therapie.* 1. Teil. Orig., 1914. Mar. 14. Vol. 21. No. 1/5, pp. 481–519.

MOUCHET (R.) & DUBOIS (A.). Essais thérapeutiques dans la Trypanosomiase humaine.—*Beihefte z. Arch. f. Schiffs- u. Tropenhygiene*, 1914. Mar. Vol. 18. Beiheft 3, pp. 5–36. [pp. 85–116.] With a map.

NEAVE (Sheffield). Big Game and Sleeping Sickness versus Man and his Animals. [Correspondence.]—*Lancet*, 1914. Jan. 10. p. 146.

NYASALAND PROTECTORATE. Sleeping Sickness Diary. Part xxii. By the Principal Medical Officer. 10 pp. 1914. Zomba: Printed by the Government Printer.

OEHLER (R.). Untersuchungen über den Dimorphismus von *Trypanosoma Brucei*. — *Zeitschr. f. Hyg. u. Infektionskr*, 1914. Apr. 4. Vol. 77. No. 2, pp. 356–370. With 8 text figs.

PRENTICE (George). Sleeping Sickness, Tsetse, and Big Game.—*Brit. Med. Jl.*, 1914. Feb. 7, pp. 293–294.

PRIMET. La Prophylaxie de la Trypanosomiase Humaine en Afrique Equatoriale française.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 287–294.

ROUBAUD (E.) & LAFONT (A.). Expériences de Transmission des Trypanosomes humains d'Afrique par les Moustiques des Habitations (*Stegomyia fasciata*).—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 49–52.

SCHILLING (Claus). Antigene Eigenschaften verschiedener Stämme ostafrikanischer Trypanosomen.—*Zeitschr. f. Immunitätsforsch. u. Experim. Therapie.* 1. Teil. Orig., 1914. Mar. 14. Vol. 21. No. 1–5, pp. 358–365.

SHIRCORE (J. O.). Suggestions for the Limitation and Destruction of *Glossina morsitans*.—*Bull. Entomol. Research*, 1914. Apr. Vol. 5. Part 1, pp. 87–90. With a sketch map.

TANON (L.) & DUPONT (A.). Le Traitement de la Maladie du Sommeil par le Galyl.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 201–216.

[Similar to a paper by the same authors reviewed in this *Bulletin*, Vol. 2. p. 353.]

TEICHMANN (Ernst). Die tierischen Trypanosomen-Krankheiten Deutsch-Ostafrikas. (Aus den Ergebnissen einer Studienreise).—*Entomolog. Zeitschr.* 1913. Vol. 27. Nos. 20 & 21.

——. Uebertragungsversuche mit Glossinen.—*Berlin. Klin. Wochenschr.*, 1914. Feb. 16. Vol. 51. No. 7, pp. 299–300.

THIROUX (A.) & PELLETIER (J.). De la Méningite aiguë dans la Trypanosomiase humaine. [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1188–1190.

TORRES (Margarinos). Molestia de Carlos Chagas. Transmissao do *T. Cruzi* pela picada do *T. megista*.—*Brazil Medico*, 1913. Aug. 15. Vol. 27. No. 31, p. 321.

TRAUTMANN (R.). Inoculation positive de *Trypanosoma cazalboui* à un *Cercopithecus patas*.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 118–121.

UHLENHUTH (Paul) & SEYDERHELM (Richard). Experimentelle Untersuchungen über den Einfluss elektrischer Schwachströme auf Trypanosomen in vitro und in vivo.—*Zeitschr. f. Immunitätsforsch. u. Experim. Therapie.* 1. Teil. Orig., 1914. Mar. 14. Vol. 21. No. 1–5, pp. 366–377.

WATSON (E. A.). Report on Dourine.—*Dept. of Agriculture, Canada. Report of the Veterinary Director-General* (F. Torrance, B.A., D.V.S.) *for the Year ending Mar.* 31, 1913, pp. 81–86. Ottawa: Printed by C. H. Parmalee.

——. The Serum Reactions and Serum Diagnosis of Dourine.—*Dept of Agriculture, Canada. Report of the Veterinary Director-General* (F. Torrance, B.A., D.V.S.) *for the Year ending Mar.* 31, 1913, pp. 102–107. Ottawa: Printed by C. H. Parmalee.

WECK. Beobachtungen über Trypanosomen des Menschen und der Tiere am Rovuma-Flusse.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Feb. Vol. 18. No. 4, pp. 113–124.

WERNER (H.). Trypasafrol und Trixidin bei menschlicher Trypanosomiasis.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 246–248.

WOOSNAM (R. B.). Report on a Search for Glossina on the Amala (Engabei) River, Southern Masai Reserve, East Africa Protectorate.—*Bull. Entomol. Research*, 1914. Feb. Vol. 4. Part 4, pp. 271–278. With a sketch map.

YORKE (Warrington) & BLACKLOCK (B.). The Differentiation of the More Important Mammalian Trypanosomes.—*Ann. Trop. Med. & Parasit.*, 1914. Apr. Vol. 8. No. 1, pp. 1–12. With 1 plate.

TUBERCULOSIS IN NATIVE RACES IN THE TROPICS.

LEGER. Recherches au Laboratoire de Bamako (Soudan français), sur l'Index paludéen, l'Index filarien, la Tuberculose et la Trypanosomiase humaine.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 77–81.

LOISELET (M.). La Tuberculose humaine a Madagascar.—*Rev. de Med. et d'Hyg. Tropicales*, 1913. Vol. 10. No. 4, pp. 193–201.

MARRABLE (Harold T.). Tuberculosis in Persia and its Treatment by Koch's Tuberculin.—*Dublin Jl. Med. Science*, 1914. Jan. 3 ser. No. 505, pp. 1–19.

PEIPER (Otto). Die v. Pirquetsche kutane Tuberkulinreaktion zum Nachweis der Tuberkulose und des Infektionsweges in unseren Kolonien.—*Arch. f. Schiffs- u. Trop. Hyg.*, 1914. Feb. Vol. 18. No. 3, pp. 93–97.

SITSEN (A. E.). Enkele aanteekeningen over het voorkomen van Tuberculose onder Inlanders in Batavia. (Met autoreferaat.)—*Geneeskund. Tijdschr. v. Nederl.-Ind.*, 1914. Vol. 54. No. 1, pp. 47–65.

ZIEMANN (H.). Bemerkungen zu der Arbeit von Dr. Peiper "Die v. Pirquetsche kutane Tuberkulinreaktion usw." in Heft 3, 1914 des Archivs.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Feb. Vol. 18. No. 4, pp. 133–136.

TYPHUS FEVER.

FRAENKEL (Eugen). Ueber Fleckfieber und Roseola.—*München. Med. Wochenschr.*, 1914. Jan. 3. Vol. 61. No. 2, pp. 57–60. With 7 text figs.

IOUDINE. Le Typhus exanthématique dans les Mines de l'Arrondissement d'Iekaterinbourg.—*Vestnik Obstchestvennoi Guiguieny*, 1913. Aug. p. 1275. [Summarised in *Bull. de l'Office Intern. d'Hyg. Publique*, 1914. Feb. Vol. 6. No. 2, p. 360.]

OUFTUGEANINOFF (M.). Le Traitment du Typhus "Exanthematicus" par l'Iode.—*Presse Méd.*, 1914. Jan. 28. No. 8, pp. 78–79.

SERGENT (Edm.), FOLEY (H.) & VIALATTE (Ch.). Transmission à l'Homme et au Singe du Typhus exanthématique par les Poux d'un Malade atteint de Fièvre récurrente et par des Lentes et Poux issue des Précédents.—*Compt. Rend. Acad. Sciences*, 1914. Mar. 30. Vol. 158. No. 13, pp. 964–968.

U.S. PUBLIC HEALTH REPORTS, 1914. Mar. 20. Vol. 29. No. 12, pp. 676–677. Typhus Fever. Its Prevalence and Geographic Distribution with Special Reference to Quarantine Administration.

UNDULANT FEVER.

BASSETT-SMITH (P. W.). Recent Research relating to Undulant or Mediterranean Fever.—*Trans. Soc. Trop. Med. & Hyg.*, 1914. Feb. and Mar. Vol. 7. No. 4, pp. 127–153. With 6 charts.

——. The Agglutination of *M. melitensis* by Normal Cows' Milk.—*Lancet*, 1914. Mar. 14, pp. 737–739.

CANTANI (Arnaldo). Ulteriore contributo sul Valore della Reazione Agglutinante per la Diagnosi della Febbre di Malta.—*Malaria e Malat. d. Paesi Caldi*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 65–79.

CARNEIRO (M. Goncalves). A Febre de Malta no Rio Grande do Sul.—*Rev. Med. de S. Paulo*, 1914. Feb. 28. Vol. 17. No. 4, pp. 56–64.

CAZENEUVE (H.). Ostéo-périostite post-mélitococcique.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 668–672.

DELLA VIDA (M. Levi). Alcune Osservazioni sopra un Epidemia di Febbre Mediterranea in un Comune della Provincia di Roma.—*Malaria e Malat. d. Paesi Caldi*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 105–120. With a plan and 2 figs.

GATTO (Alfredo). Sulla Febbre di Malta e sulla Febbre dei Tre Giorni a Scilla (Calabria).—*Malaria e Malat. d. Paesi Caldi*, 1914. Mar.–Apr. Vol. 5. No. 2, pp. 121–123.

KENNEDY (J. C.). Preliminary Note on the Presence of Agglutinins for the *Micrococcus melitensis* in the Milk and Blood-Serum of Cows in London.—*Jl. R. Army Med. Corps*, 1914. Jan. Vol. 22. No. 1, pp. 9–14. With 1 fig.

LEGER (Marcel) & DOMINICI-URBANI (Ch.). Documents relatifs à l'Extension de la Mélitococcie en Corse.—*Bull. Soc. Path. Exot.*, 1914. Dec. Vol. 6. No. 10, pp. 673–678.

PATERSON (T. F.) & BROWN (H. C.). Reflections and Proposals resulting from an Enquiry into the Causes of three Epidemics of Malta Fever occurring in the 37th Lancers and the 10th Lancers in India.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 300–310. 1913. Simla: Govt. Central Branch Press.

YAWS.

BAYMA (Theodoro). A Emetina no Framboesia Tropica.—*Revista Med. de S. Paulo*, 1913. Sept. 15. Vol. 16. No. 17, pp. 311–314. With 5 figs.

Breitenstein (H.). Ist die Framboesia tropica Syphilis?—*Dermatol. Centralbl.*, 1914. Mar. Vol. 17. No. 6, pp. 162–167. With 2 text figs.

Clark (H. C.). A Case of "Ringworm Yaws" in a Barbadian Negro.—*Jl. Cutaneous Diseases including Syphilis*, 1914. Jan. Vol. 32. No. 1, [Whole No. 376.], pp. 18–20. With 1 plate.

Collin (L.). Le Pian ou "Tonga" aux iles Loyalty.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, p. 180.

Crissiuma (E. de Freitas). Bouba.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 191–194.

Grothusen. Salvarsanbehandlung der Frambösie.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 2, p. 67.

Kerneis. Pian, Likoutombo (Fièvre éruptive spéciale), Beri-beri au Moyen Congo. Extrait du Rapport annuel de 1912. (Clinique. d'Outre-Mer.)—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feby, Mar. Vol. 17. No. 1, pp. 229–233.

da Matta (Alfredo A.). Boubas (Framboesia tropica).—*Revista Med. de S. Paulo*, 1913. Sept. 15. Vol. 16. No. 17, pp. 314–316.

Schierschmidt. Verunstaltungen einer Hand infolge Späterscheinung von Frambösie.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 2, pp. 66–67.

YELLOW FEVER.

Agramonte (Aristides). Observations upon a So-Called Parasite of Yellow Fever.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 77–81.

Fajardo (Diego Hernández). Un Caso de Fiebre Amarilla en un Nativo de Yucatan.—*Revista Med. de Yucatan*, 1914. Jan. Vol. 9. No. 3, pp. 53–58.

Guiteras (Juan). Endemicity of Yellow Fever. [Correspondence.]—*Yellow Fever Bureau Bull.*, 1914. Apr. 7. Vol. 3. No. 2, pp. 110–113.

Lafont & Cadet. Paludisme et Fièvre jaune en Afrique Occidentale française. Etude de leurs Formules Leucocytaires et Comparaison avec celles de Quelques autres Maladies.—*Ann. d'Hyg. et de Méd. Coloniales*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 1068–1106.

van Loghem (J. J.). The Yellow Fever Danger for Asia and Australia, especially after the opening of the Panama Canal.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Pt. 2, pp. 169–177.

Low (R. Bruce). A Brief Account of the Incidence of Yellow Fever throughout the World during 1911 and 1912.—*Forty-Second Ann. Report of the Local Govt. Board*, 1912–13. Supplement containing Report of Medical Officer for 1912–13. Appendix A. No. 3, pp. 148–170. With a Map. 1914. London: Printed under the Authority of H.M. Stationery Office. [Cd. 7181.]

Macfie (J. W. Scott) & Johnston (J. E. L.). Experiments and Observations on Yellow Fever.—*Proc. Roy. Soc. Med.*, 1914. Jan. Vol. 7. No. 3. Medical Section. pp. 49–67. With 5 figs. and 4 charts; and *Yellow Fever Bureau Bull.*, 1914. Apr. 7. Vol. 3. No. 2, pp. 121–144. With 1 coloured plate and 7 charts.

MISCELLANEOUS.

AINHUM, OROYA FEVER, POROCEPHALIASIS, RAT-BITE DISEASE, ROCKY MOUNTAIN SPOTTED FEVER, SNAKE BITE, SPRUE, UTA, VERRUGA PERUVIANA.

ACTON (Hugh W.) & KNOWLES (R.). The Dose of Venom given in Nature by a Cobra at a single Bite.—*Indian Jl. Med. Research*, 1914. Jan. Vol. 1. No. 3, pp. 388–413. With 3 charts.

——. & ——. The Dose of Venom given in Nature by the *Echis carinata* at a single Bite.—*Indian Jl. Med. Research*, 1914. Jan. Vol. 1. No. 3, pp. 414–424. With 2 charts.

ANDERSON (D. E.). Verruga Peruana.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 147–149.

——. The Uta Disease as seen in Peru in 1913.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 309–310.

ANDREWS (W. Horner). Experiments with Snakes.—*Union of S. Africa, Dept. of Agriculture. Second Report of the Director of Veterinary Research*, 1912. Oct., pp. 406–483. With 3 plates.

BASSETT-SMITH (P. W.). Blood Changes in Verruga and Oroya Fever.—*Trans. Soc. Trop. Med. & Hyg.*, 1914. Feb. & March. Vol. 7. No. 4, pp. 158-159. With 1 plate.

BETTS (A. J. V.). The Poison of the Krait. (Correspondence).—*Indian Med. Gaz.*, 1914. Mar. Vol. 49. No. 3, p. 125.

DALAL (A. K.). Case of Rat-Bite Fever, treated with Intravenous Injection of Neo-Salvarsan.—*Practitioner*, 1914. Mar. Vol. 92. No. 3 [No. 549], p. 449.

FRICKS (L. D.). Rocky Mountain Spotted Fever. A Report of its Investigation and of Work in Tick Eradication for its Control during 1913.—*U.S. Public Health Rep.*, 1914. Feb. 20. Vol. 29. No. 8, pp. 449–461.

FÜLLEBORN (F.). Ueber die Entwicklung von Porocephalus. (Abstract). —*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 297–298.

SCHMITTER (Ferdinand). Sprue treated by Emetine Hydrochloride.—*Military Surgeon*, 1914. Apr. Vol. 34. No. 4, pp. 330–331.

STEWART (Chas. E.). The Probable Identity of Pellagra and Sprue.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Section xxi. Trop. Med. & Hyg. Part 2, pp. 125–132.

STRONG (Richard P.). The Etiology of Oroya Fever and Verruga Peruviana.—*New York Med. Jl.*, 1914. Mar. 14. Vol. 99. No. 11. [Whole No. 1841,] pp. 535–536.

[Summary of a lecture delivered before the Harvey Society, Academy of Medicine, New York, in which the author describes the results of his recent investigations on the etiology of Oroya fever and verruga. (See this *Bulletin*, Vol. 2, pp. 619–620.)]

WEGELE. Bemerkung zu C. St. Leede: "Ein Fall von Sprue durch Erdbeeren gebessert."—*Zeitschr. f. Hyg. u. Infektionskr.*, 1914. Mar. 5. Vol. 77. No. 1, p. 188.

[A brief note stating that von der BURG and van den SCHEER were the pioneers of this treatment in Europe, and giving references to their papers.]

WEINSTEIN (Henry). A Description of Ainhum with Report of Interesting Cases occurring in one Family.—*Proc. Canal Zone Med. Assoc. Isthmian Canal Commission for the Half Year Oct. 1911 to March 1912.* Vol. 4. Part 2, pp. 110–119.

WERNER (H.). Skorbutsymptome durch einseitige Ernährung mit Haferschleimsuppen bei Sprue.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Apr. Vol. 18, No. 7, p. 252.

UNCLASSED.

ASHBURN (P. M.). A Trip to China.—*The Military Surgeon*, 1914. Feb. Vol. 34. No. 2, pp. 101–124.

BAERMANN (G.). Behandlungsversuche mit Salvarsankupfer.—*München. Med. Wochenschr.*, 1914. Jan. 6. Vol. 61. No. 1, pp. 1–5. With 2 text figs.

BESREDKA (A.). Endotoxines microbiennes.—*Bull. Inst. Pasteur*, 1914. Feb. 28. Vol. 12. No. 4, pp. 145–154 & Mar. 15. No. 5, pp. 193–205.

CANTLIE (James). The Use of the Tuning-Fork in Diagnosing the Outlines of Solid and Hollow Viscera of the Chest and Abdomen and of Certain Pathological Conditions.—*Jl. Trop. Med. & Hyg.*, 1914. Jan. 15. Vol. 17. No. 2, pp. 17–20. With 9 text figs.

CHALMERS (Albert J.) & ARCHIBALD (R. G.). Two Early Eighteenth Century Treatises on Tropical Medicine.—*Proc. Roy. Soc. Med.*, 1914. Feb. Vol. 7. No. 4. Section of the History of Medicine, pp. 98–106.

COUCHOUD (P. L.). Le Kubisagari (Maladie de Gerlier).—*Rev. de Médecine*, 1914. Apr. 10. Vol. 34. No. 4, pp. 241–296.

DARLING (S. T.) & CLARK (H. C.). *Linguatula serrata* (Larva) in a Native Central American.—*Proc. Canal Zone Med. Assoc. (Isthmian Canal Commission), for the Half Year Oct. 1911 to Mar. 1912.* Vol. 4. Part 2, pp. 11–14.

DUDTSCHENKO (I. S.). Beiträge zur Frage der Eosinophilia.—*Centralbl. f. Bakt.* 1. Abt. Orig., 1914. Feb. 11. Vol. 73. No. 1, pp. 72–74.

FRANCIS (Ernest E.). What is Chaulmoogra Oil? (Correspondence).—*Lancet*, 1914. Mar. 7, p. 718.

GÓZONY (L.). Die Abderhaldensche Reaktion bei protozoischer und metazoischer Parasiteninfektion.—*Centralbl. f. Bakt.* 1. Abt. Orig., 1914. Mar. 30. Vol. 73. No. 4/5, pp. 345–349.

de GRAAF (J.). Ein Eisbett.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Apr. Vol. 18. No. 7, pp. 255–256.

HEHIR (P.). Ulcerated and Swollen Gums in Indian Troops.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Section xxi. Trop. Med. & Hyg. Part 2, pp. 121–123.

HILL (Leonard). The Working Power of the White Man in the Tropics and the Electric Fan.—*Brit. Med. Jl.*, 1914. Feb. 7, p. 325.

HOUGHTON (H. S.). Notes of the Tropical Medicine Congress, Saigon, 1913.—*China Med. Jl.* 1914. Jan. Vol. 28. No. 1, pp. 36–39.

LEBER (A.). Chetnot Manengheng halum-tano. (Die kalte Waldkrankheit der Chamorro). Ein Beitrag zur vergleichenden Psychiatrie und zur Kenntnis des Amok.—*München. Med. Wochenschr.*, 1914. Jan. 13. Vol. 61. No. 2, pp. 60–64.

LOMBARD (Pierre). Synovite sporotrichosique à grains riziformes. Arthrite purulente sporotrichosique. Premier Cas Algérien de Sporotrichose.—*Revue Méd. d'Alger.*, 1914. Feb. No. 4, pp. 53–62. With 1 fig.

MARSHALL (D. G.). The Nomenclature of Certain Diseases as Used in India.—*Trans. Soc. Trop. Med. & Hyg.*, 1914. Feb. & Mar. Vol. 7. No. 4, p. 160.

MENSE (Carl). Handbuch der Tropenkrankheiten. 2. Auf. Vol. 2, xv.+ 747 pp. illustrated. 1914. Leipzig: Verlag von Johann Ambrosius Barth.

MORGENROTH (J.). Chemotherapeutische Studien.—Paul Ehrlich. Eine Darstellung seines wissenschaftlichen Wirkens.—*Festschrift zum 60. Geburtstage des Forschers* (14. Marz 1914). Jena: Gustav Fischer, pp. 541–582.

MUHLENS (P.). xviii. Behandlung akut bedrohlicher Zustände bei Tropenkrankheiten.—*Deut. Med. Wochenschr.*, 1914. Apr. 9. Vol. 40. No. 15, pp. 737–740.

——. xix. Behandlung akut bedrohlicher Zustände bei Tropenkrankheiten.—*Deut. Med. Wochenschr.*, 1914. Apr. 16. Vol. 40. No. 16, pp. 785–786.

NICOLLE (Charles), CUÉNOD (A.) & BLAIZOT (L.) Etude expérimentale du Trachome. Mémoire complet.—*Arch. Inst. Pasteur Tunis*, 1913. No. 3–4, pp. 157–182.

REPORT OF THE ADVISORY COMMITTEE FOR THE TROPICAL DISEASES RESEARCH FUND for the Year 1913.—iv. + 239 pp., 1914. London: H.M. Stationery Office.

da ROCHA-LIMA. Pathologisch-anatomische Beobachtungen bei einigen Tropenkrankheiten.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 57–62.

RODENWALDT (Ernst). Kryptogenetische Muskelabszesse in den Tropen.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 2, pp. 41–50.

ROGERS (Leonard). Gleanings from the Calcutta Post-Mortem Records. No. VIII (concluding) The Primary Causes of Death and the most frequent Errors of Diagnosis in 1,000 Medical Post-mortems.—*Indian Med. Gaz.*, 1914. Feb. Vol. 49. No. 2, pp. 41–45.

ROUX. Extraits des Documents techniques du Rapport annuel du Tonkin (1912). [Clinique d'Outre-Mer.]—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 241–246. [Suppurative Hepatitis, Relapsing Fever.]

SCHERER. Die weisse Besiedlung im Norden des deutsch-südwestafrikanischen Schutzgebiets.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 6, pp. 198–206.

SCHILLING-Torgau (V.). Angewandte Blutlehre für die Tropenkrankheiten.—vi. + 170 pp. With 3 coloured and 1 black and white plate and 12 text figs., 1914. Leipzig: J. A. Barth.

SCHILLING (V.). Ueber die feinere Ausarbeitung der Blutmorphologie zur Erhöhung der klinischen Verwendbarkeit und zur Abgrenzung parasitärer Bestandteile auf dem Gebiete der Tropenkrankheiten.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 299–307.

SCHMITTER (Ferdinand). Quarterly Report of the Board for the Study of Tropical Diseases as they Exist in the Philippine Islands.—*Military Surgeon*, 1914. Mar. Vol. 34. No. 3, pp. 222–228. With 3 text figs.

SEYFFERT. Erfahrungen mit Salvarsan bei Tropenkrankheiten.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 6, pp. 185–198. With 2 figs. and 1 chart.

SHIPLEY (A. E.). Pseudo-Parasitism.—*Parasitology*, 1914. Jan. Vol. 6. No. 4, pp. 351–352.

STANNUS (Hugh Stannus). Anomalies of Pigmentation among Natives of Nyasaland.—*Biometrika*, 1913. Oct. Vol. 9. Nos. 3 and 4, pp. 333–365. With 10 plates.

——The Life-Span of Negroes.—*Lancet*, 1914. Apr. 11, p. 1038. With 1 fig.

STRACHAN (Henry). Lessons in Elementary Tropical Hygiene. For the Use of Pupils in Tropical Schools. xi. + 116 pp. With 6 plates, 1913. London: Constable & Co., Ltd.

TODD (John L.). Recent Advances in Tropical Medicine.—*Canadian Med. Assoc. Jl.*, 1914. Feb. Vol. 4. No. 2, pp. 141–147.

TSCHUDNOWSKY. Acclimatement dans les Pays Tropicaux.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 63–73.

VERGNE (R.). "Espasmo Tropical": A Peculiar Disease of Great Malignancy, Associated with a Parasite in the Blood.—*Jl. Trop. Med. & Hyg.*, 1914. Jan. 15. Vol. 17. No. 2, pp. 20–21.

WITTROCK. Ueber Empfindlichkeit der Haut gegen Berührung mit Atoxyllösung.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Mar. Vol. 18. No. 5, pp. 163–164.

ZIEMANN (Hans). Gesundheits-Ratgeber für die Tropen.—4th ed. 65 pp, with 16 figs., 1913. Berlin: Dietrich Reimer (Ernst Vohsen). (M.1).

——. Ueber neuere Probleme der Tropen-Medizin.—*Zeitschr. f. Balneologie, Klimatologie u. Kurort-Hygiene.* Vol. 6. No. 23.

Biting Arthropods and Ticks.

ARAGÃO (Henrique de Beaurepaire). Bericht ueber einige Zeckensammlungen aus Brasilien.—*Memorias do Instituto Oswaldo Cruz.*, 1913. Vol. 5. No. 3, pp. 263–270. With 1 coloured plate.

BACOT (A. W.). Diseases carried by Insects.—*Jl. Royal Sanitary Inst.*, 1914. Feb. Vol. 35. No. 1, pp. 26–34.

BALFOUR (Andrew). Ants as Transmitters of Tropical Disease.—*Lancet*, 1914. Jan. 17, p. 212.

CUNLIFFE (Norman). Observations on *Argas brumpti*, Neumann, 1907.—*Parasitology*, 1914. Jan. Vol. 6. No. 4, pp. 379–381. With 1 text fig.

——. *Rhipicephalus sanguineus*: Variation in Size and Structure due to Nutrition.—*Parasitology*, 1914. Jan. Vol. 6. No. 4, pp. 372–378. With 4 text figs.

DOANE (R. W.). Disease-Bearing Insects in Samoa.—*Bull. Entomol. Research*, 1914. Feb. Vol. 4. Part 4, pp. 265–269. With 3 plates.

FRANCAVIGLIA (M. Condorelli). Parassitismo da *Rhipicephalus sanguineus* (Latr.) nell'Orecchio umano.—*Bollettino d. sedute d. Accademia Gioenia di Scienze Naturali in Catania*, 1913. Nov. Serie 2. No. 28, pp. 11–13.

GALLI-VALERIO (B.) & ROCHAZ DE JONGH (J.). Beobachtungen über Culiciden.—*Centralbl. f. Bakt.* 1. Abt., Orig., 1914. Jan. 24. Vol. 72. No. 66/7, pp. 529–531. With 1 text fig.

HENDREN (J. H.). Insects as Transmitters of Disease.—*Kentucky Med. Jl.*, 1914. Jan. 1. Vol. 12. No. 1, pp. 8–10.

HINDLE (Edward) & CUNLIFFE (Norman). Regeneration in *Argas persicus*.—*Parasitology*, 1914. Jan. Vol. 6. No. 4, pp. 353–371. With 4 text figs.

MACFIE (J. W. Scott). A Note on the Action of Common Salt on the Larvae of *Stegomyia fasciata*.—*Bull. Entomol. Research*, 1914. Feb. Vol. 4. Part 4, pp. 339–344. With 1 plate.

PATTON (Walter Scott) & CRAGG (Francis Wm.). A Textbook of Medical Entomology. xxxiii + 764 pp. illustrated. 1913. London, Madras and Calcutta: Christian Literature Society for India.

Robinson (L. E.) & Davidson (J.). The Anatomy of *Argas persicus* (Oken 1818). Part 3.—*Parasitology*, 1914. Jan. Vol. 6. No. 4, pp. 382–424. With 4 plates and 8 text figs.

Rothschild (N. Charles). The Tropical Bed-Bug, *Clinocoris hemiptera*, Fabr.—*Bull. Entomol. Research*, 1914. Feb. Vol. 4. No. 4, p. 345.

Roubaud (E.). Parasitisme chez les Reptiles du *Phlebotomus minutus* Rond. var. *africanus* Newstead.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 83–85.

Simpson (Jas. J.). Entomological Research in British West Africa. IV.—Sierra Leone.—*Bull. Entomol. Research*, 1913. Nov. Vol. 4. Part 3, pp. 151–190. With a map and 5 plates.

——. Entomological Research in British West Africa. V.—Gold Coast. —*Bull. Entomol. Research*, 1914. Apr. Vol. 5. Part 1, pp. 1–36. With 4 plates and a map.

Surcouf (M. J.). Note sur les Tabanidae d'Algérie & de Tunisie.—*Arch. Inst. Pasteur Tunis*, 1913. No. 3–4, pp. 183–186.

Weiss (Aloys) Troisième Addition (fin) au Catalogue des Arthropods piqueurs et suceurs de Djerba.—*Arch. Inst. Pasteur Tunis*, 1913. No. 3–4, p. 197.

Protozoology (excluding Trypanosomes, Leishmania, and Amoebae.)

Acton (Hugh W.) & Knowles (R.). The Nature of the Kurloff Body: A Stage in the Development of the Eosinophile Leucocyte.—*Indian Jl. Med. Research*, 1914. Jan. Vol. 1. No. 3., pp. 523–531. With 1 coloured plate.

Carini (A.) & Maciel (J. J.). Infections de Toxoplasmose et de Paralysie bulbaire infectieuse par les Muqueuses saines.—*Bull. Soc. Path. Exot.*, 1914. Feb. Vol. 7. No. 2, pp. 112–114.

—— & ——. Infeccao de Toxoplasmose e de Paralysia bulbar infectuosa pelas Muscosas sans.—*Brazil Medico.*, 1914. Feb. 1. Vol. 28. No. 5, p. 41.

—— & ——. Toxoplasmose naturelle du Chien.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 681–683.

Fantham (H. B.) & Porter (Annie). Some Minute Animal Parasites or Unseen Foes in the Animal World.—xi+319 pp. With frontispiece and 56 text figs., 1914. London: Methuen & Co., Ltd. [Price 5s. net.]

Galli-Valerio (B.). *Smithia talpae* n. sp. (Piroplasmidae) chez *Talpa europaea L.*—*Centralbl f. Bakt.* 1. Abt., Orig., 1914. Feb. 25. Vol. 73. No. 2, pp. 142-143. With 1 text fig.

Franca (Carlos). La Flagellose des Euphorbes.—*Arch. f. Protistenkunde*, 1914. Mar. 28. Vol. 34. No. 1, pp. 108-132. With 1 coloured plate and 4 text figs.

Hetzer (Margarethe). Studien über Protozoen, insbesondere des Darms. —*Zeitschr. f. Hyg. u. Infektionskr.*, 1914. Apr. 1. Vol. 77. No. 2, pp. 304–310.

Kuczynski (Max H.). Untersuchungen an Trichomonaden.—*Arch. f. Protistenkunde*, 1914. Mar. 3. Vol. 33. No. 2, pp. 119–204. With 6 plates and 4 text figs.

Lagane (L.). Les Protozoaires en Pathologie humaine.—*Presse Méd.*, 1914. Mar. 7. No. 19, pp. 181–185. With 8 figs.

LAVERAN (A.). & FRANCHINI (G.). Infezione Sperimentale dei Mammiferi mediante Flagellati del Tubo Digerente del *Ctenocephalus canis*.—*Pathologica*, 1914. Jan. 1. Vol. 6. No. 124, p. 1.

[An Italian version of the first part of a paper by the same authors published in *Compt. Rend. Acad. Sci.* Paris, 1913. Nov. 4., Vol. 157. No. 18. p. 744 and already summarised (*see* this *Bulletin* Vol. 3. p. 122).]

—— & ——. Infection naturelle du Rat et de la Souris au Moyen de Puces de Rat parasitées par *Herpetomonas pattoni*.—*Compt. Rend. Acad. Sciences*, 1914. Feb. Vol. 158, pp. 450.

—— & ——. Infection de la Souris au Moyen des Flagellés de la Puce du Rat, par le Voie Digestive.—*Comp. Rend. Acad. Sciences*, 1914. Mar. 16. Vol. 158. No. 11, pp. 770–772.

—— & MARULLAZ (M.). Sur deux Hémamibes et un Toxoplasme du *Liothrix luteus*.—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 21–25. With 14 text figs.

—— & ——. Sur la Nature des Corps de Graham-Smith.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 240–246. With 1 plate.

MIGLIANO (Luiz). Os Toxoplasmas.—These apresentada á Faculdade de Medicina do Rio de Janeiro no dia 29 de Setembro de 1913. e defendida no dia 20 de Dezembro de 1913. 76 pp. With 5 figs., 1913. Rio de Janeiro: Typ. de Martins de Araujo & C.

NOC (F.). Sur la Durée de Conservation de Protozoaires a l'Etat humide ou desséché.—*Compt. Rend. Soc. Biol.*, 1914. Feb. 6. Vol. 74. No. 4, pp. 166–168.

—— & STÉVENEL (L.). Flore Intestinale du *Stegomyia fasciata* adulte.—*Bull. Soc. Path. Exot.*, 1913. Dec. Vol. 6. No. 10, pp. 708–710.

PLATE (Ludwig). Brief Note on *Toxoplasma pyrogenes*, Castellani, 1913.—*Jl. Trop. Med. & Hyg.*, 1914. Apr. 1. Vol. 17. No. 7, p. 98. With 3 text figs.

SANGIORGI (Giuseppe). *Leucocytogregarina cuniculi*, n. sp.—*Pathologica*. 1914. Jan. 15. Vol. 6. No. 125, pp. 49–50. With 3 text figs.

SARRAILHÉ (A.). Notes sur la Toxoplasmose expérimentale.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 232–240.

SCHILLING (Claus). Immunität bei Protozoeninfektionen.—*Handbuch der Pathogenen Mikroorganismen*, 1913. Vol. 7, pp. 565–606. With 1 text fig.

SCHILLING-Torgau (V.). Berichtigung zu Kamil Schulhof: Studien über die Kurloffkörper nebst. Beiträgen zur vergleichenden Hämatologie. Dieses Archiv, 1913. Bd. 17. Heft 2.—*Folia Haematologica* (*Archiv*), 1914. Jan. Vol. 17. No. 4, pp. 419–428.

SCHULHOF (K.). Entgegnung auf V. Schillings "Berichtigung" zu meinen "Studien über Kurloffkörper."—*Folia Haematologica* (*Archiv*), 1914. Jan. Vol. 17. No. 4, pp. 447–451.

VON WASIELEWSKI (Th.). Zur Kenntnis der Halteridienkrankheit der Vögel.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 245–249.

WOLBACH (S. B.). Notes on the Life Cycle of a Hemogregarine found in a Monitor (*Varanus niloticus*).—*Jl. of Med. Research*, 1914. Jan. Vol. 29. No. 3 (New Series, Vol. 24). Whole No. 142, pp. 473–488. With 2 plates.

Woodcock (H. M.). On "*Crithidia*" *fasciculata* in Hibernating Mosquitoes (*Culex pipiens*) and the Question of the Connection of this Parasite with a Trypanosome.—*Zoologischer Anzeiger*, 1914. Jan. 20. Vol. 43. No. 8, pp. 370–382. With 41 figs.

—— & Lapage (G.). On a Remarkable new Type of Protistan Parasite.—*Quarterly Jl. Microscopical Science*, 1913. Nov. Vol. 59. Part 3, pp. 431–457. With 2 plates and 2 text figs.

See also **Amoebiasis, Kala Azar** *and* **Sleeping Sickness.**

APPLIED HYGIENE IN THE TROPICS.

Adams (G. F.). A Report on the Pilgrim Route to Badrinath.—*Indian Jl. Med. Research*, 1914. Jan. Vol. 1. No. 3, pp. 425–480. With 1 map and 8 plates.

Bannerman (W. B.). Anti-Malarial Measures—Itinerating Dispensaries. —*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 13–14. 1913. Simla: Govt. Central Branch Press.

Bulletin de l'Office International d'Hygiène Publique. 1914. Mar. Vol. 6. No. 3, pp. 441–445. Fonctionnement des Services d'Hygiène en Algérie en 1913.

Bulletin de la Société Médicale de l'Ile Maurice. 1913. July–Aug.–Sept. Vol. 31. 2me Série. No. 33, p. 45. Etat Sanitaire de la Colonie pendant le trimestre finissant le 30 Septembre, 1913. [H. C.]

Canal Record. 1914. Feb. 11. Vol. 7. No. 25, pp. 239–240. With 5 text figs. Insect Trap. Local Invention designed chiefly to Catch Mosquitoes by Means of Human Scent.

Conan. Service de Santé en Afrique equatoriale française.—*Jl. of State Medicine*, 1914. Mar. Vol. 22. No. 3, pp. 163–172.

Couvy. Travaux d'Assainissement de Quelques Centres importants de la Côte d'Ivoire.—*Ann. d'Hyg. et Méd. Colon.*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 961–979; and 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 97–114.

Delanoë (P.). Le Fonctionnement du Parc vaccinogène de Bouaké du 10 mars au 31 décembre 1913.—*Bull. Soc. Path. Exot.*, 1914. Mar. Vol. 7. No. 3, pp. 246–254. With a map and 2 text figs.

Von Ezdorf (R. H.). Prevention of Malaria. Suggestions on how to Screen the Home to keep out effectively the Mosquitoes which spread the Disease.—*U. S. Public Health Rep.*, 1914. Feb. 27. Vol. 29. No. 9, pp. 503–508. With 2 plates.

Grijns (G.) & Leusden (J. Th. C. A.). Onderzoek van eenige Bronnen in Soekaboemi.—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1913. Vol. 53. No. 6, pp. 758–770.

Grimm. Theoretische Betrachtungen über einen von Prof. Dr. Ziemann empfohlenen Sedimentierungs-Tank.—*Arch f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 2, pp. 60–62. With 1 text fig.

Hehir (P.). Sanitary Organization in the Tropics.—*Trans. xvii International Congress of Medicine*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 1, pp. 45–55.

Heiser (Victor G.). Relative Efficiency of Rat Traps. Type of Trap which has proved most effective in Manila.—*U.S. Public Health Rep.*, 1914. Feb. 6. Vol. 29. No. 6, pp. 341–342.

Heusch. Organisation sanitaire de la Colonie de Tahiti. Réalisations et Projets (1910–1913).—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 17. No. 1, pp. 24–40. With a map.

Hintze. Die Organisation des Sanitätswesens in den Deutschen Kolonien Afrikas und der Südsee.—*Trans. xvii International Congress of Medicine*, London. 1913. Sect. xxi. Trop. Med. & Hyg. Part 1, pp. 57–62.

HOSSACK (W. C.). Preliminary Note on Asino-Vaccine.—*Indian Med. Gaz.*, 1914. Feb. Vol. 49. No. 2, pp. 49–51.

JAMES (S. P.). assisted by DE SILVA (W. T.). Reports of Sanitary Inquiries in Jaffna and the Northern Ports, and in Galle. 8 pp. folio. With a map. 1914. Colombo: Printed by H. C. Cottle, Government Printer, Ceylon. [IV.—1914. Ceylon.] Price 25 cents.

KERGROHEN. Notes sur Quelques Hôpitaux de l' Extrême-Orient et du Pacifique.—*Arch. de Méd. et Pharm. Navales*, 1913. Dec. Vol. 100. No. 12, pp. 423–437.

LAFAURIE. Protection de la Santé publique au Gabon. Extrait du Rapport médical annuel de 1912.—*Ann. d'Hyg. et de Méd. Colon.*, 1913. Oct.–Nov.–Dec. No. 4, pp. 1190–1193.

LANCET. 1914. Feb. 21, p. 575. Mosquito Nets. [Correspondence.] (W. E. C. L.)

LÉGER. Recherches Scientifiques entreprises au Laboratoire de Thai-Ha-Ap dans le Cours de l'Année 1910.—*Ann. d'Hyg. et Méd. Colon.*, 1914. Jan.–Feb.–Mar. Vol. 16. No. 1, pp. 140–149. [Vaccination.]

LEMOINE (G. H.). Rapport du Médecin-Inspecteur G. H. Lemoine, Membre du Comité Consultatif de Santé, sur la Campagne Antipaludique entreprise en Algérie-Tunisie depuis l'Année 1905.—*Arch. de. Méd. et de Pharm. Militaires*, 1914. Apr. Vol. 63. No. 4, pp. 380–390.

Le ROY DES BARRES (A.). Rapport sur le Fonctionnement du Bureau d'Hygiène de la Ville de Hanoi en 1913.—*Bull. Soc. Méd. Chirurg. de l'Indochine*, 1914. Feb. Vol. 5. No. 2, pp. 65–75; and Mar. No. 3, pp. 91–122.

McCOY (George W.). Sanitary Conditions in Hawaii.—*Amer. Jl. Public Health*, 1913. Dec. Vol. 3. No. 12, pp. 1273–1278.

MACDONALD (Angus). Sanitary Conservancy in Kingston, Jamaica.—*Jl. of State Med.*, 1914. Feb. Vol. 22. No. 2, pp. 112–120.

MURISON (C. C.). How to keep Flies off Edible Articles for Sale.—*Indian Med. Gaz.*, 1914. Feb. Vol. 49. No. 2, pp. 56–57.

ORENSTEIN (A.). Zur Technik der moskitosicheren Häusereindrahtung.—*Arch. f. Schiffs- u. Trop.-Hyg.*, 1914. Jan. Vol. 18. No. 1, pp. 16–24. With 2 text figs.

[Corresponds closely with the paper by the same author noticed in this *Bulletin*, Vol. 3, p. 150. Some extra technical details of the composition and manufacture of the wire gauze are given.]

PRIMET. L'Epuration des Eaux de Boisson.—*Trans. xvii Intern. Congress of Med*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 251–255.

——. Le Fonctionnement des Services de Santé Coloniaux.—*Trans. xvii Intern. Congress of Med.*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 2, pp. 257–267.

PROCEEDINGS OF THE SECOND ALL-INDIA SANITARY CONFERENCE held at Madras, November 11th to 16th, 1912. Vol. 2. Hygiene. 567 pp.; Vol. 3. Research. 315 pp.; Vol. 4. Engineering. 93 pp. With 2 plates and 1 plan. (1913. Simla: Govt. Central Branch Press.)

RINGENBACH (J.). Emploi du Vaccin sec en Afrique Equatoriale française (Moyen Congo).—*Bull. Soc. Path. Exot.*, 1914. Jan. Vol. 7. No. 1, pp. 17–18.

ROSS (H.). Travelling Dispensaries.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 3–12. 1913. Simla: Govt. Central Branch Press.

Ross (Ronald). Report on the Prevention of Malaria in Cyprus. 34 pp. 1914. London: Printed under the Authority of H.M. Stationery Office by Darling & Son, Ltd. [Cd. 7174.]

——. Malaria in Cyprus and Greece.—*Proc. Roy. Soc. Med.*, 1914. Mar. Vol. 7. No. 5 (Sect. of Epidemiology & State Med.), pp. 107–115.

——. Sanitary Organization in the Tropics.—*Trans. xvii International Congress of Medicine*, London, 1913. Sect. xxi. Trop. Med. & Hyg. Part 1, pp. 63–69.

Ryan (J. Charles). Health Preservation in West Africa. With an Introduction by Sir Ronald Ross.—xv + 96 pp. With 1 plate. 1914. London: John Bale, Sons & Danielsson, Ltd. [Price 5*s.* net.]

Sorel. L'Hygiène à la Côte d'Ivoire en 1912.—*Ann. d'Hyg. et de Méd. Coloniales*, 1913. Oct.–Nov.–Dec. Vol. 16. No. 4, pp. 946–961.

Turkhud (D. A.). Dracontiasis.—*Proc. Second All-India Sanitary Conference*, 1912. Vol. 3, pp. 118–120. 1913. Simla: Govt. Central Branch Press.

See also **Cholera, Kala Azar, Leprosy, Malaria,** *and* **Plague.**