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UROCISSA FLAVIROSTRIS FLAVIROSTRIS.

The Yellow-billed Blue Magpie.

⅓ Nat. size.

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Journal

OF THE

Darjeeling Natural History Society.

The Yellow-billed Blue Magpie

Urocissa flavirostris flavirostris (Blyth).

(With a coloured plate).

An account of this beautiful Magpie was given in *Vol. VI. No. 3. p. 89.* The bird from which the coloured plate was drawn was obtained at Rambi (*7,000 ft.*), about 6 miles from Gl[illegible], on the 5th December 1931. It is shown - ½ natural size. The cost of reproduction of this plate and [illegible] there others we owe to the great generosity of [illegible] of our members, Mr. Walter Duncan (Editor).

Beebe in his sumptuous [illegible] of which 6 are found in India and Burma and all the others, 26 in number, which include the 19 named by Oates, he considers to be wild hybrids. Blanford in the *1st edition* of the *Fauna of British India* allowed 6 species and described 2 sub-species from India and Burma. In the *2nd edition* of this work, Stuart Baker allows 5 species and 5 sub-species from the same area.

Only one of these is known to occur in our area, though it is possible that the Nepal bird may stray across.

Kalij Pheasants have long, usually disintegrated, crests, those of the hens being rather shorter. The face is bare and in the cock there is a lappet beneath it. The colour of this bare area is crimson.

(30). The Black-backed Kalij Pheasant.

Gennœus melanotus (Blyth).

The cock has the upper plumage black glossed with violet and edged with velvety-black; the shafts of the feathers are white; wing-coverts, secondaries and tail glossed with green; ear coverts and chin and throat unglossed black; the feathers of the breast are lanceolate (long and pointed), white in colour, brownish at the base; posterior abdomen and vent brown. Some fine cocks have very narrow white edges to the scapulars.

The cocks measure up to 25 or 26 inches and have tails up to over 12 inches. Weight up to 2 lbs. 12 ozs.

The bill is greenish-horny, darker at base and blackish round nostrils; iris hazel-brown; legs and feet pale horny-brown. There is generally one spur on each leg of the cock, though in a specimen sent us by Smyth-Osbourne each foot has a small sharp supplementary spur at the base of and below the ordinary ones.

In the hen the general colour is deep brown or in dark specimens blackish-brown edged with grey or white, these margins being very wide on the wing-coverts and lower plumage; face, chin and throat grey; quills brown; centre tail feathers rufous-brown, vermiculated with rufous; other tail feathers dark brown glossed with green.

Hens measure up to 21 inches and have tails up to about 8½ inches. Weight up to 2 lbs. 4 ozs.

In young birds the sexes are distinguishable, the cock being much darker and blacker, while the hens are browner and redder; the tail feathers of the cock are glossed with green and those of the hen are mottled black and chestnut or reddish-brown.

The chick in down has from crown to mantle rich rufous, the remainder of the upper plumage chocolate-brown with two buff stripes from scapulars to tail; a black line from the eye to the neck; lower plumage buffy-white tinged with rufous on the flanks; the wing-coverts broadly edged with buff.

The distribution of this Pheasant is given by Stuart Baker as:—"Sikkim; West into Nepal, probably to the Arun River; East to Bhutan". It occurs over a much smaller area than the other birds of this genus. With regard to the distribution in our area, it occurs from the plains level at *300 ft.* up to *8,600 ft.*, where some were seen by J. L. Baker. The Sankos will probably prove to be the E. boundary but birds must stray into Assam, as a bird shot by Shebbeare in Goalpara

was a hybrid between this and the Black-breasted Kalij. Masson wrote that they were found as high as *10,000 ft.* but this is doubtful and the highest of which we have any record is at Senchal (*8,600 ft*). Mr. Gent never found them above *8,000 ft.* and said there used to be a party near the Rimbick bungalow at that elevation which remained there the whole year, but that they were commonest below *6,000 ft.* They are common in the Tista Valley in the cold weather and may be resident. They may be seen in Darjeeling: we have on several occasions come across them on Birch Hill and one was shot between the Museum and the Convent. In the Duars they are fairly plentiful in places: we have seen them at Gorumara (*300 ft*). They remain all the year round. They are said not to go far from the hills but we have seen them at Lataguri, which must be about 16 miles from the foothills as the crow flies. In the hills they seem to like damp evergreen jungle near streams, ravines and hillsides wherever the cover is good; they are also often flushed from the tea. In the plains too they seem to like the lower lying humid parts of the forest. They feed during the morning and evening and may then be flushed from the side of the roads (we have put them up from the edge of the P. W. D. road running along the Tista Valley) or from the jungle paths. When flushed they rise with a sharply repeated *Kookri! Kookri! Kookri!* or *Koorchi-Koorchi-Koorchi.* Beebe says they are fond of murmuring to each other and also have a contented cluck, uttered when quietly feeding, also "when suspicion comes and a warning is intended, a series of these clucks is run together, ending with a loud, shrill screech or chirp....." Gammie says "when, however, the males are in the fighting humour—which they usually are about breeding time—their call, as they advance towards each other, is *'koor koor' 'waak waak'*, the former being the threatening and the latter the attacking note. They also sometimes answer each other's call in the jungle". The cock makes a drumming noise more often in the breeding season. Beebe says he "drums by quivering its wings through a narrow arc, between its sides and the level of its back, the sound resulting from the air rushing between the large flight feathers". A cock we saw called from the ground and made a whistling sound.

They are, like Jungle-fowl, great runners and able to move quickly and silently through the dense undergrowth. When flushed from the hillside they make for the

nearest bit of forest, preferring to fly downwards but when flushed from the tea often fly up hill. As Stuart Baker says:—"Like all the Kalij Pheasants, it is a tremendous runner, and when worked with beaters only will seldom rise until it reaches the very edge of the forest or bushes, when it gets up with a rush and a flurry of wings, soon getting up a considerable pace. If flying downhill, it alternately sails and flies with rapid beat of wings until it sails out of sight....." If flushed by a dog they often fly into a tree. Masson wrote he had shot six in a day. He also shot five on another occasion while wandering along the Rangirun road with a dog.

Beebe gives an interesting account of the food of this Pheasant. He writes:—"There are few edible morsels which come amiss to the Black-backed Kaleege. Its food is varied in the extreme, and includes fruit, seeds and insects of all kinds. It will pursue flying grasshoppers and moths, and I have even seen them leap into the air after the little drab forest butterflies. Especially do they love the grubs and larvæ of dung insects and those which live in rotten wood, and they even swallow the small millipede pill-bugs, armour and all.....Yams are also a favourite article of diet, and the pheasants will often dig quite deep holes and trenches in the mould of open forest glades in search of these fleshy tubers. When they go into the small, field-like places along the edge of the forest, the Kaleege find an abundance of seeds of weeds, grain, and other plants and, in addition, they eat the young tops of ferns and nettles, many kinds of berries, and the fruit of a *Polygonum* and a raspberry which abound in Sikkim.....A male bird shot in the late evening had been feeding exclusively on insects, all but one of which were moths. Among these were one large one (*Arcte caerulea* Guerrée), the remainder being smaller and of as yet undescribed species. With these was an enormous orange-headed wasp (*Vespa magnifica* Smith)".

They roost on the same place every night, several birds together, the young also roosting with the old birds, so their roosting places are easily discovered by the droppings on the ground. On going to roost the Kalij flies up into the tree, looks round in all directions, walks along a branch till a suitable place is found and settles down for the night.

Kalij Pheasants are bold. Once in Cachar I shot a hen and the cock came straight at me as if to attack but thought better of it.

Stevens says Martins do a lot of damage to the eggs and young birds. Eagles and the large Eagle Owl must also take toll of some numbers and Beebe mentions a nest of eggs destroyed by a bear.

The breeding season is from March to the end of June but eggs are also said to have been taken at the end of July in the upper limit of its range: the lower down it is, the earlier it breeds. With regard to this Stuart Baker says:—"In the lower elevations at which these Pheasants bred, say from 1,500 to 3,000 feet, March and April are the two months in which most eggs are laid; from 3,000 to 4,500 feet, the 25th April to end of May or early June are the favourite breeding months, whilst in the highest ranges they breed from May to the end of June or even July, and I have had hard-set eggs sent me which were taken in August below Darjeeling." They scrape a few leaves together or sometimes not even this but only those collected in a hollow which the bird presses down: favourite spots are thick undergrowth, ravines, dense forest, dense bamboos and also in tea gardens in the weeds below the tea bushes. The nests are always well concealed Six to eight seems to be the usual number of eggs laid but ten has been recorded. Bailey saw a captive cock lifting up sticks and throwing them over its shoulder. Beebe writes:—"Unusually fortunate covies, including eight young, have been observed but two, three, or at the most four are the more usual number of survivors of the nesting perils". We saw a hen with seven chicks in May.

The eggs vary in shape, some being longer or broader than others and the colour also varies from pale cream to pale *cafe-au-lait* and rich coffee colour. The average size as given by Hume is 48.5×36.3 mm.

They are not difficult birds to keep in captivity once one can get them to settle down after the first few days. Beebe writes:—"A number of Black-backed Kaleege were among the survivors of the large pheasant collection which was received in London in July 1857, and they bred in the gardens of the Zoological Society the following year. Since then this species has been reared in captivity many times in most of the large public collections and by many private individuals. Two rather remarkable crosses have been produced of this species with the Impeyan and with Reeves pheasant.....The period of incubation of the Black-backed Kaleege is about twenty-four days; of eight individuals confined in the London Zoo, of which a record has been

kept, the average length of life was three years and nine months, while the longest-lived Kaleege survived for a period of thirteen years and five months, this being the record for longevity for the whole genus".

Both O'Donel and myself have seen a Kalij Pheasant near Sivoke in the Tista Valley with white bars on the rump, as found in Nepal and Black-breasted birds, but other birds seen there have been the Black-backed species. The birds we saw may have been either the Nepal bird or hybrids. We give the distinguishing features of the Nepal Kalij Pheasant (*Gennæus leucomelanus* (Lath.) in case it is come across:—In the cock the crest is black as in our Sikkim bird and the upper plumage is glossed with steel-blue. The principal difference is on the rump, the feathers there being glossy blue-black with a solid fringe of white and the lanceolate feathers on the breast are not as white as in our bird.

The hen is very similar to that of the Black-backed Kalij Beebe, writing about the latter bird, says:—"Fresh skins of this species show a very decided difference from the females of the Nepal Kaleege in the very pronounced melanism of the entire plumage. Whereas the latter would be described as rufescent, *melanonotus* is distinctly black.....In the vermiculations of the middle tail-feathers *melanonotus* has the red darker, more rufous and less buffy than in *leucomelanus* .....Then again in *melanonotus* the lateral tail-feathers are almost wholly unmarked greenish, lacking the paler vermiculation which in *leucomelanus* often extends over the margins of several pairs".

Stuart Baker gives the distribution of the Nepal Kalij Pheasant as:—"Nepal, as far East as the Arun River. I procured several specimens from Dhamkhata on the Tamra, which runs into the Arun. Nepalese traders at Pankabari and Jalpaiguri bring down this species for sale".

(To be continued)

The Crow Family of our area.

By

C. M. Inglis, F. Z. S., F. E. S., E. M. B. O. U.

(Continued from page 141 of Vol. VI.)

[14. The Large Spotted Nutcracker]

Nucifraga multipunctata, Gould.

Field identification—Very similar to the last species, rather darker and with more white on it; the lower plumage sometimes looks almost all white. Found in the same situations as the last bird but not often occuring together. Length 15 inches: tail 6½ inches.

Description—Differs from the Himalayan Nutcracker in being more a chocolate than umber-brown in colour and much more marked with white; the naral bristles are mottled black and white; the rump and upper tail-coverts each have a white spot; there are more white spots on the coverts and quills and a great deal more white on the lower plumage, sometimes making the whole of it appear almost white. Sexes alike.

Iris red-brown; bill horny brown; legs and feet black.

Distribution—In our area. Stuart Baker says it is found in Sikkim and Osmaston (*Journal Bombay Natural History Society, Vol. XIV, p. 819*) says "here in Sikkim it appears to be the only species found". Our Darjeeling birds show no white spots on the rump and upper tail coverts and are referable to the last species. Possibly Osmaston didn't collect any specimens. Stevens never came across it in Sikkim nor did Meinertzhagen. It is doubtful whether this race ever occurs within our limits.

Outside our area—"N. W. Himalayas from Afghanistan, Gilgit, Kashmir, Ladakh to S. E. Tibet.....Chumbi Valley....." (*Stuart Baker*). Bailey (*Journal Bombay Natural History Society, Vol. XXIV, p 75*) records it from the Mishmi Hills Meinertzhagen found all the Nutcrackers at Chakrata (not far from Simla) to be the last species and with regard to Baker's distribution remarks:—"Baker tells me.....that he has received specimens from the Chumbi Valley and Phari in Tibet. But Phari is "Tibetan Plateau" and quite an impossible treeless region where no Nutcracker could live. Baker also cites Ladak as the range of *multipunctata*. I know of no part

of Ladak where the Nutcracker could live, except where it borders Kashmir proper" (*Ibis 1927, p 370*). Ludlow only mentions *hemispila* from the Chumbi Valley.

Habits, etc.—These differ in no way from those of the Himalayan Nutcracker. The only information I can find about the nesting of this species is a note by Stuart Baker (*F. B. I. Birds, 2nd ed. Vol 1, p. 68*):—"Eggs sent me by Mr. D. Macdonald with the parent birds from the Chumbi Valley are exactly like those of the European Nutcracker: very pale blue-green speckled with dark brown sparsely everywhere and a little more numerous at the larger end. They measure about 33.6×24 6 mm." The nest appears to be similar to that of the last species.

We now come to the Choughs, which belong to the genus *Pyrrhocorax:* birds of black plumage with brilliantly coloured bills and legs. The following key will suffice to distinguish the two species:—

A. Bill long and slender.
a Bill and legs red .....The Himalayan Red-billed Chough.

B. Bill shorter and stouter
b Bill yellow, legs red.. ...The Himalayan Yellow-billed Chough.

15. The Himalayan Red-Billed Chough.

Pyrrhocorax pyrrhocorax himalayanus (Gould)

Field identification—A glossy black bird like a Crow, with bright red curved bill and legs. It is found at elevations over 8,000 feet and may be seen circling in the air or swooping down with closed wings or else on the ground. The call, melodious but plaintive, is well known to all who travel at high elevations.

Description—Length about 17.7 inches. The whole plumage glossy black. Sexes alike but the female is slightly smaller.

Iris brown: bill vermilion-red; legs "more purplish and not of such a bright vermilion red as the bill" (*Ludlow*).

The Himalayan Red-billed Chough is a larger bird than the European one and is generally admitted to subspecific rank.

Distribution—In our area. In Sikkim at elevations "between 8,000 and 16,000 feet in winter" (*Meinertzhagen*). Probably occurring even higher in summer.

Outside our area—"Throughout the Himalayas to Eastern Tibet" (*S. Baker*). They sometimes descend

as low as *5,000 feet* in winter and Wollaston recorded them as high as *20,000 feet* on Everest in September (*Ibis 1928, p. 526*). Hingston however did not come across it higher than *15,000 feet*.

Habits, etc—The Himalayan Red-billed Chough is a noisy bird and its melodious though rather plaintive cry resembles its European cousin, which Seebohm renders as *Khéé'-o, khéé'-o*, and is well known to those who travel where this bird is found. The flight is somewhat characteristic—"a series of curves in the air, alternately rising with a scream, and then suddenly dropping with almost closed wings" (*Howard Saunders*). They are quite at home on the ground, walking and running with ease, and are gregarious in habits. The European bird is said to pair for life, so it is probable that our bird does so too. Ludlow writes:— "In winter it collects in huge flocks in barley-fields on the Gyantse plain. Often these flocks can be seen circling at an immense height, then with closed wings down come the birds, one after another, in a swift, slanting stoop. In the winter of 1924, while hunting for 'Shao", the great Tibetan stag, in the Chumbi Valley, hundreds used to swoop down after sunset and roost under the eaves of the houses in the village of Rupinkang, where I was staying. Nest construction begins in March, and eggs are to be found in April and May. Sometimes the nests are situated in inaccessible cliffs, sometimes in holes in the walls of inhabited and uninhabited houses only a few feet from the ground. At times the bird will be found breeding in colonies, at other times only solitary nests will be found. It will construct its nest in the most secluded place imaginable, or right in the midst of a village. Frequently the same site is occupied year after year. The nest is made of sticks and twigs and is lined with wool. Three or four eggs constitute the normal clutch" (*Ibis 1928, p. p. 53-54.*) The eggs are, according to Hume, "moderately elongated ovals, very slightly compressed towards the small end. The shell is tolerably fine and has a slight gloss. The ground colour is white with a faint creamy tinge, and the whole egg is profusely spotted and striated with a pale, somewhat yellowish brown and very pale purplish grey. The markings are most dense at the large end, and there, too, the largest streaks of the grey occur". They measure about 1.74×1.2 inches.

The European bird is said to live 16 or 17 years.

16. The Himalayan Yellow-billed Chough.

Pyrrhocorax graculus forsythi (Stoliczka).

Field identification—A black crow-like bird, rather smaller than the Red-billed Chough, with a shorter yellow bill and red legs. It is a noisy, sociable bird found at the same altitudes as the last species.

Description—Length about 16½ inches.

The whole plumage black, slightly glossed, except on the wings and tails, which are very glossy. Sexes alike, except that the female is slightly smaller.

Iris brown; bill yellow; feet vermilion-red.

Himalayan birds are larger than European ones and are now generally considered a separate race.

Distribution - In our area. Found by Stevens on the Singalila ridge at Sandakphu (*11,850 feet*) in early March and at Kalopokhri (*10,160 feet*) about the middle of April. He also saw some at Lachung (*9,000 feet*), in Sikkim, during the last week in February and first week in March. Meinertzhagen occasionally saw some in Sikkim in November "between 9,000 and 16,000 feet between Lachen and Gyagong". We have never seen them.

Outside our area—"Throughout the Himalayas from Kohat to Central Tibet and South-East Tibet" (*S. Baker*).

Habits, etc.—This is a sociable bird, like the Red-billed one, and is usually seen beating along the hillside or gliding with outstretched wings. They are just as much at home on the ground as the last bird. Stevens saw them sailing overhead near Sandakphu "settling alternately on the low bushes and rocks, hopping about the ground in the beds of the gullies on the steep, rocky slopes, and were most fearless, occasionally uttering a weird plaintive call" [*Journal Bombay Natural History Society, Vol. XXIX, p. 518*]. He never met any near villages, but Whistler, writing in the *Ibis* on the "*Birds of Spiti*", says:—"This Chough is a scavenger round camps and villages, and the carcases of small birds skinned were readily eaten by it". Hingston found them in company with the Red-billed Chough in Dharmsala, and again in his "*Bird Notes from the Mount Everest Expedition of 1924*" writes:—"A bird of higher altitudes than the previous species. A permanent resident of our base-camp at 16,500 feet. In camp it was extremely tame, as impudent and daring as the house crow, living on the scraps thrown out of the cooking-place, and spending the day amongst our tents. On the cliffs is

used to associate with herds of Burhel, picking insects out of their hair" (*Journal Bombay Natural History Society, Vol. XXXII, p. 321*). Flocks were seen as high as *23,640 feet* and birds followed all the camps even up to *27,000 feet*.

Ludlow came across a flock of 200 or more feeding on the hips of rose bushes during the winter at Yatung in the Chumbi Valley but failed to find it near Gyantse.

Meinertzhagen found a couple of pairs breeding near Leh at *11,600 feet*, in May, in inaccessible holes. Baker writes:—"Eggs have been taken in the Liddar Valley and in S. E. Tibet in April and May from nests placed in steep rocky cliffs, either in holes or in crevices in rocks.....The ground-colour is a very pale yellowish grey, rarely with a cream tint, and the spots are of light brown and neutral tint, rather sparse as a rule but more numerous at the larger end" (*F. B. I. Birds, 2nd ed. Vol. I. p 70*). No measurements are given.

This species will not live in captivity in Bengal; although greatest care was taken of a couple that reached the Alipur Zoo, they died within a month and a half. An Alpine Chough has lived in the London Zoo for 8 years, 9 months and 8 days.

We now come to the last genus of the family, containing some remarkable birds called Ground Choughs and placed in the genus *Podoces*. One has been found in India and it has only of recent years been obtained within our area. They are small sandy-brown birds with long bills, short wings and strong legs; the nostrils are completely concealed by stiff plumes.

17. Hume's Ground Chough.

Podoces humilis (Hume).

Field identification.—An active sandy-brown coloured little bird, harmonizing well with its habitat. It has a longish bill and strong legs and feet. Its flight is very feeble and when it alights it bobs in a most absurd manner. With us it does not appear to descend lower than *14,800 feet*, keeping to the bare highlands of North Sikkim.

Description—About 6½ to 6¾ inches long.

Sandy-brown above; wing brown, edged with sandy-brown; the lower plumage and a collar round the neck isabelline; the middle tail-feathers are blackish-brown, edged with buff, the remainder buff fading to isabelline on the outermost. Sexes alike but the female is slightly smaller.

Iris brown; bill and legs black.

Distribution—In our area. Hingston is the first person to come across these birds in our area and, as a matter of fact, in India. He saw some at Thangu, in Northern Sikkim, at an elevation of *14,300 feet* during the Everest Expedition of 1924 (*Journal Bombay Natural History Society, Vol. XXXII, p 321*). Meinertzhagen was mistaken when he wrote that his specimens "appear to constitute the first authentic record of the bird from British India" (*Ibis 1927, p. 374*). Meinertzhagen got his birds at Gyagong, also in Northern Sikkim, at between *14,800* and *15,750 feet* in November 1925. We did not come across it, either at Gyagong or further up in the middle of October 1927. Stuart Baker writes that specimens were sent to him "from the Chambi Valley in the extreme north of Sikkim". Of course the Chumbi, not Chambi, Valley lies in Tibet and not in Sikkim.

Outside our area—"Yarkand to Tibet, Koko Nur and Kansu" (*S. Baker*).

Habits, etc.—A bird of apparently elevations between *11,000* to *15,000 feet* but in Sikkim it does not appear to descend below *14,300 feet*. It is often seen on the bare plains with Mouse Hares (*Ochotona*) or Pikas as companions.

Its flight is very weak and not sustained and where it alights, generally on some stone or rock, it bobs up and down in a most absurd manner, according to Ludlow, uttering at the same time a plaintive cry. It is better at home on the ground, its strong legs enabling it to hop or run about with ease. Hingston says it frequents stone walls, the roofs of buildings and also enters villages freely, besides being found in the most barren tracts. Its food appears to be wholly worms and insects.

The only detailed account of this bird, as seen in Sikkim, is by Meinertzhagen. He writes:— "It was a great surprise meeting these delightful little birds in northern Sikkim. When I first spied them I was puzz'ed. At the first glance their pale nape made me think they were the Snow-Finch (*ruficollis*), but as they were running about like Larks, hopping on to stones like a Wheatear and bobbing their heads up and down like the Little Owl, their identity was soon disclosed. The first flock seen comprised seven birds. They were on open flat country and in among dwarf rhododendron, and only just above the tree-line of birch and large

rhododendron, which was not far distant and in full view at the time. They are wonderfully active little birds, sprightly, full of queer antics, running with lowered head and suddenly jumping on to a boulder, where they would bob up and down, the whole body being lowered in the movement. They would frequently give a huge hop off the boulder to secure some delicacy, immediately returning once again to re-commence the bobbing. This occurred on 20th November when we camped at Gyagong. Throughout the 21st we remained at Gyagong and never saw a Podoces, though we scoured the country in all directions.

Great was our surprise on the 22nd to find at dawn our camp surrounded by small parties of *Podoces*, which had obviously arrived quite recently, this being confirmed by the fact that the stomachs of five examined had no trace of food. It was bright frosty weather and the thermometer stood at 3° F. Their flight is short and Shrike-like. When feeding they hammer away at frozen objects with great energy, poking their heads under boulders and into rock-crevices, all with much haste and determination" (*Ibis 1927, p. 374*).

It breeds commonly in Tibet "between Phari and Gyantse, sometimes in a bank, sometimes on hill-slopes and sometimes in small "bunds" separating the barley-fields. The nest is always at the end of a hole, six or more feet long, and is a large untidy mass of dried grass and fibres lined with wool and hair. Nest construction starts in May, and eggs may be found in June and July. Two clutches which I obtained each contained six eggs, pure white, averaging 21.25×15.5" (*Ludlow, Ibis 1928, p. 55*). They apparently often make use of the deserted burrows of Mouse-Hares *(Ochotona)* to nest in. Hingston dug four feet into one of these and was still far from reaching the nest. Dressers gives the depth of a burrow as sometimes 12 feet.

Observations on Emerald Dove's nest and young, and certain habits.

By

Dr. Satya Churn Law, M. A., Ph. D., F. Z. S., M. B. O. U.

Apropos of Mr. Inglis's theme on the Emerald Dove (*Chalcophaps i. indica* Linn.) I have to offer, in response to his direct exhortation to me, the following observations as a result of my personal experience. Extremely gratifying as it is to note that Mr. Inglis considered it worth while to touch on the avicultural aspect of his subject, I need hardly emphasise that in the present state of our knowledge of this bird aviculture helps to fill some part of the gap in regard to such details as nidification, nestling characters, etc. I have had, and still continue to have, immense opportunities of studying the habits of these Doves—I have in my aviaries not less then seven pairs, all offspring among others of one original pair which is with me for more than four years and still going strong—and calling as much experience of them as my free moments permit. Looking up my record of last year (1931) I notice that the pair referred to above had as many as 6 nests (January to December) and in continuation of their nidificatory attempts had two more nests in the course of January and February, 1932. Of the 6 nests made in 1931 one only failed, its contents of one egg having been lost due to an accident; the other 5 nests produced a brood of 2 young each. The details of nesting are recorded below, with dates of each egg laid and of chicks hatched.

Nesting results for 1931.

Nest No. 1.		
Jany. 30	1st egg laid	♀ bird found incubating early morning.
,, 31	2nd egg	
Feby. 13	1st chick out	
,, 14	2nd chick out	
Nest No. 2.		
March 9	1st egg	incubation starts.
,, 10	2nd egg observed	
,, 23	1st chick out	
,, 24	2nd chick out	

Nest	**No. 3.**		
April	18	one egg laid	
,,	19	damaged by a fall	♀ bird broody
,,	20	2nd egg laid	
,,	23	egg disappears	♀ bird still broody
,,	26	3rd egg observed	
May	11	chick out	observed early morning.
Nest	**No. 4.**		
June	6	one egg laid	incubation begins
,,	7	2nd egg	
,,	19	1st chick out	
,,	20	2nd chick out	
Nest	**No. 5.**		
Nov.	19	one egg laid	
,,	20	2nd egg laid	
Dec.	2	one chick hatches out	
,,	3	2nd chick appears.	

It will be seen from the above that the Emerald Dove has for each month almost one separate brood, and this continuously from January to July. The period August-October remains a gap because the mother bird, which was at this time in low health, had to be shut up and given a compulsory respite. Left to herself, she would have certainly gone in for one other nest at least (during August-October). It has been stated by Mr. Inglis that these birds have "two or possibly three broods"—this record of his evidently being based on what Mr. Stuart Baker has said (viz. "the majority of the birds undoubtedly have two broods and many probably have three"). The remarkably large broods reared in captivity are no doubt made possible by the favourable circumstances, which minimise the struggle for existence. Yet the one lesson of science, which one can hardly let go by default, shows the instinct of the bird and its propensity for breeding throughout the year. The eggs laid in each nest are uniformly two in number. Should an accident happen to an egg immediately after it is laid, a third egg is produced as a rule. But if two eggs are somehow damaged, no more than the third egg is laid (vide breeding result for Nest No. 3). The second egg appears almost as a rule on the day next after the first egg has been laid but sometimes the second egg is laid on the 3rd day. The female bird begins to sit tight soon after her first egg appears. The first egg hatches out first and the

second, irrespective of the fact of its appearance on the second or even the third day, hatches out invariably on the date immediately following that of the appearance of the first chick. The period of incubation of the eggs as observed by me is 14 to 15 days, but is in midsummer earlier by a day. Although the female bird shoulders mostly the nidificatory duties, the male takes his share, not only in the task of nest-building but also in incubating the eggs and feeding the young. After one brood has been reared, the position of the old nest—and in fact its foundation—is again utilised for the new nest which has to be prepared for the second brood. Sometimes I have noticed a blind instinct gets the mastery over all intelligence of the female bird which, while still engaged in rearing the brood which just fledged out, acts no better than an automaton and goes straight for laying another clutch of eggs and sitting tight on them. In a case like this, in order to give the growing young a chance of living, I have no other alternative but to shut them up with their male parent (which will not shirk feeding them) in full view of the breeding hen. When there is such fury of egg-laying, the old nest is utilised as it is by the bird without any chance of its being repaired or remodelled. Mr. Inglis has, in common with a few other ornithologists, referred to the compactness of nests of this Dove. But so far as my avicultural observation goes, I find it difficult to call them compact; on the other hand, they are uniformly neat but loose platforms of roots, fibres and slender twigs, saucer-like in shape with a hollow or depression in the centre and devoid of any lining. I may add I hardly notice any difference between the nests made in my aviary with the examples I have come across in the wild state in my district. The feature of looseness in the composition of these nests admits of the possibility of their being seen through by a person standing underneath. A compact structure will hardly admit of this possibility. The nestlings, which are almost invariably two in number, grow rapidly, the task of feeding them being shared by both parents. It is interesting to note a parent feeding both its young by letting in their beaks together within its own mouth and regurgitating food. In its effort to blow out the food it has a queer shortened, albeit swollen, appearance with the young nestled against its bosom. No sooner has a week passed since the hatching of the eggs than do the nestlings, which have been born naked and

blind, begin to put on their juvenile garb. The transition from nestling to juvenile plumage forms, no doubt, the subject of an interesting study. An equally interesting study is the change from juvenile to adult coloration. Unfortunately the record in Mr. Stuart Baker's new Avifauna is silent in this respect. Captain Hutton's meagre description of the nestling plumage is thus quoted in Hume's Nests and Eggs: "the nestling birds are spotted with rusty buff, somewhat resembling those of our Indian Turtle Dove." Blanford wrote in the older Fauna Volume—"young birds are at first dull brown above, with very little green, and are barred rufous and dark brown beneath." As I find in my diary an entry relevant to the point, I quote it below: it refers to a nestling, hardly ten days old, evincing even at this stage by its metallic green spots the change setting in towards juvenile coloration.

"Head and neck, sides of head and neck, throat and chin bare; upper breast brown with rufous bars; lower breast and abdomen bare; flanks brown with rufous bars; back and rump light brown with white edges; upper tail coverts dull brown; tail undeveloped; primaries dark brown tipped, mottled and edged with rufous broadly in outer and narrowly in inner webs; inner aspect of primaries dull brown, sprinkled with rufous; inner secondaries dark brown, tipped with rufous, the outer web with some metallic green; scapulars and wing coverts dark brown, the primary and greater coverts with rufous tips, the latter with rufous mottlings from shaft to outer web near the tip; the median coverts dotted in centre with rufous; wing-lining and axillaries bare

Iris dark brown; bill slaty; the cere darker; legs and feet slaty, the claws with lighter tips; gape fleshy plumbeous".

I find another entry in my diary relating to a young a little over two months old. I quote it below, as it depicts the transition stage from juvenile to adult coloration:

"Forehead bluish grey with light rufous edges; supercilia light rufous; crown, nape and back dull blackish brown with light rufous tips; sides of the head and neck with considerable fine rufous barrings; lower back, scapulars, wing coverts and inner secondaries tipped with metallic emerald green and with varying amount of bronze reflections, the bases of the feathers dark brown with no green metallic sheen; bastard wing, primaries,

primary coverts, outer secondaries and greater coverts dark brown with rufous tips and edges; the inner webs of the primaries mottled with rufous; least wing coverts and shoulder of wing blackish brown like the neck with rufous edges; under-wing coverts and axillaries copper red; lower back dull black with a band of feathers across fringed white; some feathers with bronze sheen towards tip; rump grey tipped white next the lower back, dark brown towards upper tail coverts, with a subterminal band of rufous, the feathers tipped distinctly black; upper tail-coverts slaty towards base with broad subterminal band of rufous, and tipped black; tail dark brown washed with rufous, the outer feathers grey with a broad black band and patch of rufous on both webs; the outermost feather with no rufous, under-tail coverts slaty black washed with rufous; chin and throat light rufous; breast and lower parts vinous red paling on the abdomen; flanks dark grey washed with vinous red.

Bill reddish black, the red showing in the centre parts more of the upper mandible, extending to the cere, blackish toward tip; iris dark brown; eyelids slaty grey; bare patch round eye; lores bare; legs dusky red; claws horny; toes reddish plumbeous; soles pale fleshy".

Rightly says Mr. Inglis that this Dove does very well in captivity, being naturally a peace-loving and long-lived bird. A newly-caught specimen readily reconciles itself to cage-life, and a grain-eater as it is, the aviculturist finds it easy enough to manage without recourse to the multifarious menu which, however scrupulously prepared, has its efficacy discredited not unoften in the case of many newly captured insectivorous birds. In a mixed aviary I have kept my Emerald Doves with great success and without any untoward result. I might mention that their companions are a mixed lot of birds of varying sizes from a small Flower-pecker to a Barbet or a Thrush. The difference of opinion referred to by Mr. Inglis as to the suitability of keeping them with other birds is more fancied than real, and it seems to me that he has misunderstood what Mr. Finn wrote about them. The latter, however, discovered the unsociable manner of this Dove only in relation to birds of the allied genera, if not of the same species, and specially when these were caged otherwise than in a good-sized aviary. True it is that birds of the same species are in many cases hostile to one another and this hostility is specially in evidence in the breeding season in an aviary where more than

one pair of the same species is kept together. A pair of Emerald Doves in such circumstances will never tolerate the company of another pair, or even of an additional male or female Dove. Such fights are sometimes also manifest where a breeding pair of Emerald Doves is housed together with a pair of Doves of any of the allied genera, say, the Spotted Dove. The fight has its relation chiefly to the breeding propensity when the breeding pair has undergone the inevitable physiological change in its system and develops an idea of territory. Several immature birds and even unmated adults can be safely kept together in an aviary and I have found these are inoffensive even when kept with Red Turtle Doves and the semi-domesticated albino Doves. In a fairly large aviary the chances of hostility are to a great extent minimised and more than a pair will manage to perform their nesting operations, etc., without any apparent inconvenience to one another. Mr. Finn no doubt refers to this phase of the Dove's temperament and rightly pronounces his verdict thus: "in captivity it is given to bullying other Doves. For a good-sized aviary, however, it is a very nice bird".

SATYA CHURN LAW,
30-3-32.



Notes on the Natural History and Shikar of Indian Deer

By

Colonel H. S. Wood, I. M. S.

(*Continued from page 194 of Vol. VI*).

7. Burmese Brow-antlered Deer.

The Burmese name is *Thamin*. I have not had much opportunity for knowing or shikaring this deer. I took two trips into Burmah, when stationed in Manipur, both trips aggregating three months.

I suppose, next to the Barking Deer, this is the commonest and most widely distributed deer in that country and every sportsman there must have shot it. It is the game of the sporting Tommy Atkins and takes the place of the Black buck in India. The Burmese recognize two varieties of this deer, the *Thamin Wah* and the *Thamin Whet*. The difference between the two has simply been brought about by a difference in the surroundings and nature of the food of the two animals. The *Thamin Wah* is found in very dry and arid country, sandy, very sparse grass and forest; the only tree I saw, where I obtained this *Thamin*, was the babool or Mimosa. Water in these parts, especially during the winter, is very scarce and the Burmans told me that this animal can go without water for a very long time and sometimes resorts to drinking its own urine. There may be some truth in this statement, as all the animals I shot had a distinctly nasty odour. I would like to know if any readers of the Journal have heard of this. My brother and I saw lots of them in the country lying between Manipur and Sagaing and especially numerous at Aligappa, which is about half way.

The *Thamin Wah* is not a handsome animal: the colour is light brown, the coat stiff and staring. The horns obtained in this locality were poor and very brittle. One of the stags which I shot broke its right horn when it fell. A most unusual incident happened when I shot this stag. A doe was standing beside the stag and the Meade shell which I fired burst low, bowled over the stag and unfortunately broke the leg of the doe. The Burmans with me gave chase and secured her, much to their delight. The Burmans being Buddhists

won't take life but they were glad of a feast of meat provided by someone else. They will eat anything. I once killed a Hamadryad and the Burmans took it away to eat. They gather round a carcase like vultures and once, when I shot an elephant, by the evening nothing but the bones were left. The "boss" took the tip of the trunk and I gathered that it was dried and used as a medicine.

My brother and I were mounted; it was a long way to Sagaing and we were determined to take some of the venison to our people but how? that was the question. However we cut off a haunch and for 15 miles we carried it, alternately, in one hand, with it resting on the saddle. We were sorry afterwards for taking all that "swank", as it was the nastiest venison I have ever tasted. I forgot to mention that in the country where we found this deer there was any amount of madder, a shrub with rather a pretty broad leaf, milky juice and blue flowers. I was told that the *Thamin* were very fond of this plant

On my second visit to Burmah, my brother was stationed at Shwebo, and as there was some fine *Thamin Whet* ground in the neighbourhood we planned an expedition. My brother told me that the deer were shy and the forests thick, so that it was hopeless trying to stalk them on foot. He got hold of two Burmese carts, rigged up bushes at the sides and away we went. It appears that the Thamin does not mind a cart, as they are so accustomed to seeing those belonging to the people that work in the forest. The same stratagem is used for getting near Black buck in the North West Provinces. The Burmese cart will go anywhere and the bullocks are certainly wonderful. After many joltings and descending and ascending nullahs and ditches we arrived at the teak forest but nothing could be heard except the creaking and bumping of the cart. On entering an open glade in the forest a splendid sight met our gaze. There were 15 or 16 stags all together, apparently collected for a fight I picked out one and my brother another; both fell and the rest galloped away. My stag's head was a very fine one, so I was very well pleased. The horns were very dark, the royals flattened at the ends with five or six tines projecting from the edges of each; they were rough like a Sambhur's; the brow antlers had a sharp upper edge and were very white at the tips, and near the base there was a small tine like a tubercle.

The Burmans call this variety *Thamin Whet*, from the fact that the animal has long bristly hair like a pig, *Whet* being the Burmese for pig.

The stag I shot was almost black, but others I noticed were lighter in colour, being younger. The hair was long and bristly and uncommonly like that of a pig.

The *Thamin Whet* cannot do without water and must have marshes or partly dried up pools in which to wallow, and certainly the country through which we passed resembled this. It also must have forest in which to lie up during the hot hours of the day.

Next day I got a running shot at a stag and as he ran he made a rattling sound. I got him and on examination found that his coat was covered with black, wet clay; on the upper parts this had formed into elliptical shaped balls about the size of a plum. There were masses of these and it was these knocking against each other which had produced the noise.

I suppose the young are spotted like other deer. I never saw a single doe, so cannot describe her. I have, unfortunately, not got my measurements of horns. I have seen many heads in Burmah but the finest collection of heads of this deer I ever saw was that of Waller Senior Esq. of the Survey in Bangalore. I doubt whether any Museum has such a fine show.

[As already mentioned under the Manipur Deer, Blanford placed the *Thamin* and it together as one species (*Cervus eldi*)., Oldfield Thomas in the *Journal of the Bombay Natural History Society, Vol XXV, p. 36* separated these and also split up the Burmese animal into two subspecies, the Pegu Thamin (*Rucervus thamin thamin* Thos.), in which the antlers spread widely outward almost from the burr, and the Ruby Mines Thamin (*Rucervus thamin brucei* Thos.), in which the antlers rise parallel for some distance and then spread feebly outwards. The type locality of *R. thamin thamin* is Pegu and that of *R thamin brucei* the Ruby Mines; the latter apparently, as far as our knowledge goes, is confined to that district.

Contrary to our author's opinion, Evans considers the *Thamin*, in point of beauty, comes next to the Kashmir stag and beats the Chital. He stands about 45 inches at the shoulder and has a thick mane of coarse hair. Evans says the does, which are light fawn colour, "are smaller in comparison with the size of the stag than most deer." The young, like all other Indian deer except the Sambhur, are spotted.

We pillage Evan's *Big game Shooting in Upper Burma* for a description of the head and measurements of horn. The head "is long and narrow; the horns, almost touching at the base, sweep backwards and outwards, coming forward again so as to form a semicircle. But the chief peculiarity of this deer, and one from which it gets its name, is that the brow antler, instead of growing at an angle from the beam..... comes forward in one continuous curve, so that the effect, when seen in profile, is that of an almost complete circle There is usually a false point on the axle, and one or two on the brow antler, which is extremely long. There is generally also a point, from about six to nine inches long, close to the top of each beam, which may be destitute of further points, or may split up into several." The number of points seems to vary a lot: Evans mentions one with fourteen. The colour of the horns also varies from golden-brown to bluish-grey and every intermediate shade. Evans thinks, and we agree, that "when measuring heads of this deer, the length of the brow antler should be given, as half the beauty of a thamin's head lies in the brow antler". Our author appears to have done this when measuring the horns of the closely allied Manipur Deer. Evans considers a good average head to be "one of about 34 in., with a brow antler of 12 or 13 in." The biggest he ever got measured "37½ in., with a brow antler of 17½ in." but he says "Heads measuring 42 in., and over, exclusive of the brow tine, have been shot." Rowland Ward's record is of a stag shot in Upper Burma and owned and measured by the Mess, 1/10th Gurkha Rifles. It measures:—44" Length on outside curve, not including brow-tine. 6½" circumference. 24½" Tip to tip. 36¾" Widest inside. 9+5 Points.

The Thamin is a much persecuted animal, both by Europeans and natives Anybody with a gun, whether he has or has not a license, is after his blood and shoots him down regardless of the size of heads procured. The Burmese also hunt him with dogs but are not very successful at this sport but nevertheless the poor deer is much harried.

Evans speaks of the preponderance of does, for which he blames the Game Laws. He says:—"As they stand at present, there is no limit to the number of thamin which may be killed, nor any specification as to size of the head, nor is there any charge for shooting them. But the shooting of females is strictly prohibited." He advocates that the Local Government should for the next

two years "limit the number of stag heads to four, none to be shot without a game license costing Rs. 30 (to include big game of all kinds except elephants), and would permit two thamin does to be shot by the license-holder in addition to the stags." When the number of does has been reduced sufficiently, then the shooting of them should be prohibited. This was written in 1911. We wonder what the condition of the *Thamin* is at the present day? Now that Burma has started game sanctuaries with a European Forest Officer in charge, perhaps the number of warrantable stags is on the increase. Another criticism of the Game Laws in force when this sportsman wrote is that "No males of deer, barking deer excepted, are permitted to be shot *in reserved forests* between June 15 and October 15.....But thamin do not shed their horns till August, and they are not entirely free from velvet till the middle or end of January. Therefore, would it not be as well to make the close season for thamin from August 1, or earlier, to February 1, omitting the words 'in reserved forests' and making an exception in the case of villagers whose crops thamin are in the habit of visiting?" This appears to be sound except for the "exception." Once an exception in made in the rules, it would be very difficult to prove that the deer were *not* shot while feeding on the crops and the whole rule would be negatived. Possibly the Game Laws have been revised since 1911.

Evans says "When thamin are found in the open it is very interesting stalking them on foot. They are extremely wary and seldom allow a man within a hundred yards". He gives some very interesting remarks about their fighting proclivities and says "The stags are very belligerent, and whether it is due to the peculiar curve of the brow antler, or their excessive fighting proclivities, the fact remains that a large number are blind in one eye, and many in both. The proportion of old stags who have lost one or both eyes from horn thrusts is, I should say, certainly not less than one in three. The rutting season lasts from February to the end of April, after which the old stags go off, either alone or attended by one or two does or a small stag, who acts as a fag. A good head with a herd is seldom seen after May. The best time for thamin shooting is from March up to the middle of April." [Editor.]

(To be continued)

Some Fishing notes by a tyro.

At the moment I am solely interested in fly fishing. A few years ago I went out a lot with P., who seemed to get very small return for the hours of casting and reeling in, of course I was very young in those days. After a visit to the Jaldacca this cold weather with two keen fishermen, one of whom used big tackle and had a blank day, I thought I would try the Rydak and Sankos with a fly despite the dictum of the experts that these two rivers h d never yielded a fish to a fly yet. At the beginning, using a variety of home salmon and trout flies, I was almost forced to believe the experts were right; however, for want of some better way of wasting time and money I got up a challan of weird and most unlikely looking flies from Manton's and have had really good fun. 'R and I have been out every week and between us have come to the conclusion that for small Mahseer a fly spoon takes best, while Katli take certain flies and a fly spoon equally well. I find that a Durant's Dusty Queen (on No 6 Limerick hooks) is very deadly: Katli cannot resist it over here. A Hardy's Favourite is useful as a change, while the only fish I have heard of being caught at Bhutan Ghat this year (on the Rydak) was a Mahseer (1½ lbs.) on a Durant's Red Dragon when the river was coming down like a bottle of Guiness. To my mind there is no more pleasant way of spending one's leave day than with a light fly rod; what matter a blank day or two? They have been spent in delightful surroundings.

Fairweather does not seem to think much of the Sankos: there is a nice pool at the bund for heavy tackle, while above the bund, if one is prepared to wade the small side stream to which he refers, there is very nice water for both fly and spoon. A boat or an elephant would be a great help. The two best fish I have had reported were both taken in the Sankos, a 25 pounder at Balapara and another of 22 lbs. A good deal of poaching goes on, which is very difficult to stop, mostly in the form of night lines and dead bait.

The Rydak has been disappointing for some years, probably owing to the trap referred to being improved or used more extensively. C & G. fished it thoroughly

ZOOLOGICAL GARDEN CALCUTTA

from Bhutan Ghat to Teamari this year and the former told me it was no use whatever. The Western channel has been bone dry all this cold weather, while during last rains the Eastern channel went further east and took the Natai channel (beween Newlands tea and Teamari). This channel is a mass of small streams, where the Dowla rejoins the Rydak: I believe it used to be a great spot, but now there is very little water. However, there are plenty of small Mahseer and Katli to be had, and the attraction of clear water even at this time.

Can you or any members suggest why we do not seem to get the so-called Indian Trout (*Barilius bola*) in the Rydak or Sankos? (We have seen them caught in the Harwaputa-Mook opposite Mornai, which to all intents and purposes is the Sankos *Editor)* They are found in the Jaldacca up to 2 lbs. and are a very sporting fish I am told. If any one has caught them here I should be more than grateful for information as to where and how? Has anyone ever fished the Jainti river? There is nice water high up if one is not afraid of some stiff climbing and wading.

23rd May 1932. F. R.

With regard to *Barilius bola* Mr. Shebbeare writes:—"I am not sure as to having ever seen one in the Rydak. I should say it is unusual for anybody, even if he fishes a lot, to get more than half a dozen in the season, though he might if he laid himself out to do it—so he isn't what one would call common anywhere. If I were out to get them for a bet or something, I would try in a small sandy stream a good way from the hills. The Rydak and Sankos are not too far east for *Barilius bola*, because they are commoner in Goalpara than in the Duars—if anything.

He is certainly a sporting fish, only you unfortunately mostly get him on too heavy tackle.

You can see what I *take* to be them flashing in almost any small, sandy stream, but of course these may be other species of *Barilius* or even *Danio*—they look too big to be anything but *Barilius bola* or *Barbus spilophilus* (used to be called *Barbus chagunio*)."

Museum. There are 12 of them but unfortunately 8 of them are from one locality—Mungpoo, at an elevation of 3,000 to 3,800 feet. Only 2 were from the Dooars. The following table shows how they agree with Stejneger's characters:—

Character	For *gramineus*				For *stejnegeri*			
	1	2	3	4	1	2	3	4
10 High level snakes	2	0	0	8	8	10	10	2
2 Low level snakes	2	1	1	1	0	1	1	1

Character 4 gives an opposite decision to all the others and is even less reliable with our snakes than with the Chinese Leaving that out, it is evident that our hill snake are *T. g. stejnegeri* but that the two Dooars snakes are nearer *T. g. gramineus*, though not far enough from the hills to have the full characteristics of that race.

Among Stejneger's snakes was one labelled Darjeeling in the British Museum, which he noted as exceptional because it gave a preponderance of lowland characters, and I think there can be no doubt that this must have come either from the Dooars or the Terai.

G. E. Shaw.

The Green Pit-Viper

We have received from the U. S. National Museum among the "Proceedings" a paper on the Green Pit-Viper (*Trimeresurus gramineus*) by Leonhard Stejneger. In this, after reviewing the work of earlier authorities on this snake, he comes to the conclusion that there are three forms, which he names:—

1. *Trimeresurus gramineus gramineus* Shaw.
2. *Trimeresurus gramineus stejnegeri* Schmidt.
3. *Trimeresurus gramineus yunnanensis* Schmidt.

The last one only occurs in Yunnan and is distinguished by having only 19 scales round its midbody instead of 21. The other two are distinguished on 4 characters, viz:—

1. Size of internasals and their contact or separation by intervening scales.
2. Fusion of the nasal shield with the first supralabial or their separation by suture.
3. Presence or absence of one or more scales between the nasal and the shield bordering the pit anteriorly.
4. Size and arrangement of gular scales.

Stejneger was able to examine 65 specimens, of which 11 came from Himalayan regions and the rest from China or the Farther East, and concludes that the mountain form is *stejnegeri* and the lowland form *gramineus* but that the characters are variable. For character 1, 97 per cent of the mountain form have small internasals separated by intervening scales, while 80 per cent of the lowland form have large internasals in contact. Taking character 2, 97 per cent of the mountain form have the two shields separate and 77 per cent of the lowland form have them fused. With character 3, 97 per cent of the mountain form have one or two intercalated scales and 67 per cent of the lowland form have none. With character 4, 59 per cent of the mountain form have the chin scales irregular and 88 per cent of the lowland form have them paired.

Character 4 is evidently the least reliable. Nevertheless, he says, in nearly every instance it is possible to refer a specimen to its proper geographical series by a combination of the characters.

After reading the paper, it became of interest to examine the specimens of *T. gramineus* in the Darjeeling

List of the Butterflies found in our area.

By

C. M. Inglis, F. Z. S., F. E. S., E. M. B. O. U.

(*Continued from page 124 of Vol. VI.*)

Family VI. Nymphalidæ

*228 *Charaxes polyxena hierax* Fd.
The Tawny Rajah.
* ♂ variety *hindia*. But.
♂ variety *pleistoanax*. Fd
*229 *Charaxes aristogiton*. Fd.
The Scarce Tawny Rajah.
*230 *Charaxes marmax* Wd.
The Yellow Rajah.
†231 *Charaxes kahruba* M.
The Variegated Rajah.
*232 *Charaxes fabius fabius* F.
The Black Rajah.
*233 *Eriboea athamas athamas* Dr.
The Common Nawab.
*234 *Eriboea arja* Fd.
The Pallid Nawab.
235 *Eriboea moori sandakanus* Frub.
The Malayan Nawab.
*236 *Eriboea dolon centralis* Roth.
The Stately Nawab.
*237 *Eriboea eudamippus eudamippus* Db.
The Great Nawab.
*238 *Helcyra hemina* Hew.
The White Emperor
*239 *Apatura sordida sordida* M.
The Sordid Emperor.
*240 *Apatura ambica ambica* Koll.
The Indian Purple Emperor.
*241 *Apatura chevana* M.
The Sergeant Emperor.
*242 *Apatura parvata* M.
The Brown Prince.
*243 *Apatura parisatis parisatis* God.
The Black Prince.
*244 *Herona marathus marathus* Db.
The Pasha.

*245 *Sephisa chandra* M.
The Eastern Courtier.
*246 *Euripus consimilis consimilis* Wd.
The Painted Courtesan.
*247 *Euripus halitherses* Db.
The Courtesan.
*248 *Diagora persimilis persimilis* Wd.
The Siren.
*249 *Hestina nama* Db.
The Circe.
*250 *Calinaga buddha gautama* M.
The Freak.
*251 *Penthema lisarda lisarda* Db.
The Yellow Kaiser.
*252 *Dichorragia nesimachus* Bdv.
The Constable.
*253 *Stibochiona nicea nicea* Gray.
The Popinjay.
*254 *Euthalia lepidea lepidea* But.
The Grey Count.
*255 *Euthalia julii appiades* Men.
The Common Earl.
*256 *Euthalia jahnu jahnu* M.
The Plain Earl.
*257 *Euthalia kesava arhat* Fruh.
The Powdered Baron.
*258 *Euthalia telchinia* Men.
The Blue Baron.
*259 *Euthalia garuda suddhodana* Fruh.
The Baron.
*260 *Euthalia jama jamida* Fruh.
The Streaked Baron.
*261 *Euthalia phemius* Db.
The White-edge Blue Baron.
*262 *Euthalia lubentina indica* Fruh.
The Gaudy Baron.
*263 *Euthalia franciæ franciæ* Gray.
The French Duke.
†264 *Euthalia duda* Stg.
The Blue Duchess.
*265 *Euthalia durga durga* M.
The Blue Duke.
*266 *Euthalia nara nara* M.
The Bronze Duke.

*267 *Euthalia sahadeva sahadeva* M.
The Green Duke.
†268 *Euthalia iva* M.
The Grand Duke.
269 *Euthalia nais* Forst.
The Baronet.
270 *Euthalia anosia saitaphernes* Fruh.
The Grey Baron.
*271 *Lebadea martha martha* F.
The Knight.
*272 *Neurosigma doubledayi doubledayi* Wd.
The Panther.
*273 *Abrota ganga* M.
The Sergeant Major.
*274 *Liminitis danava* M.
The Commodore.
*275 *Liminitis zayla* Db.
The Bicolour Commodore.
*276 *Liminitis daraxa* Db. & Hew.
The Green Commodore.
*277 *Liminitis dudu* Wd.
The White Commodore.
*278 *Liminitis zulema* Db.
The Scarce White Commodore.
*279 *Liminitis procris procris* Cr.
The Commander.
*280 *Pantoporia nefte inara* Db.
The Colour-Sergeant.
*281 *Pantoporia cama* M.
The Orange Staff Sergeant.
*282 *Pantoporia selenophora selenophora* Koll.
The Staff Sergeant.
*283 *Pantoporia zeroca* M.
The Small Staff Sergeant.
*284 *Pantoporia opalina orientalis* El.
The Hill Sergeant.
*285 *Pantoporia ranga ranga* M.
The Blackvein Sergeant.
†286 *Pantoporia asura asura* M.
The Studded Sergeant.
*287 *Pantoporia perius* L.
The Common Sergeant.
*288 *Pantoporia jina* M.
The Bhutan Sergeant.

*289 *Neptis columella ophiana* M.
The Shortbanded Sailer.
290 *Neptis jumbah jumbah* M.
The Chestnut-streaked Sailer.
291 *Neptis megadha khasiana* M.
The Spotted Sailer.
*292 *Neptis hylas varmona* M.
The Common Sailer.
293 *Neptis hylas astola* M.

*294 *Neptis soma soma* M.
The Sullied Sailer.
*295 *Neptis nandina susruta* M.
The Clear Sailer.
*296 *Neptis yerburyi sikkima* Evans.
Yerbury's Sailer.
*297 *Neptis sankara quilta* Swin.
The Broad-banded Sailer.
*298 *Neptis vikasi pseudovikasi* M.
The Dingy Sailer.
*299 *Neptis cartica cartica* M.
The Plain Sailer.
†300 *Neptis anjana nashona* Swin.
The Rich Sailer.
*301 *Neptis ananta ochracea* Evans.
The Yellow Sailer.
*302 *Neptis miah miah* M.
The Small Yellow Sailer.
*303 *Neptis antilope melba* Evans.
The Variegated Sailer.
*304 *Neptis manasa* M.
The Pale Hockeystick Sailer.
305 *Neptis nycteus nycteus* De N.
The Hockeystick Sailer.
306 *Neptis narayana nana* De N.
The Broadstick Sailer.
*307 *Neptis radha radha* M.
The Great Yellow Sailer.
*308 *Neptis zaida* Db.
The Pale Green Sailer.
*309 *Neptis viraja viraja* M.
The Yellowjack Sailer.
*310 *Neptis hordonia hordonia* Stoll.
The Common Lascar.

*311 *Cyrestis cocles cocles* F.
The Marbled Map.
*312 *Cyrestis thyodamus thyodamus* Bdv.
The Common Map.
*313 *Chersonesia risa* Db.
The Common Maplet.
*314 *Pseudergolis wedah* Koll.
The Tabby.
*315 *Hypolimnas misippus* L.
The Danaid Eggfly.
*316 *Hypolimnas bolina* L.
The Great Eggfly.
*317 *Doleschallia bisaltide continentalis* Fruh.
The Autumn Leaf.
*318 *Kallima inachus inachus* Bdv.
The Orange Oakleaf.
*319 *Kallima alompra* M.
The Scarce Blue Oakleaf.
320 *Precis hierta hierta* F.
The Yellow Pansy.
*321 *Precis hierta magna* Evans.
*322 *Precis orithyia ocyale* Hub.
The Blue Pansy.
*323 *Precis lemonias lemonias* L.
The Lemon Pansy.
*324 *Precis almana almana* L.
The Peacock Pansy.
*325 *Precis atlites* Joh.
The Grey Pansy.
*326 *Precis iphita iphita* Cr.
The Chocolate Soldier.
*327 *Pyrameis cardui* L.
The Painted Lady.
*328 *Pyrameis indica indica* Herbst.
The Indian Red Admiral.
*329 *Vanessa canace canace* L.
The Blue Admiral.
*330 *Vanessa ladakensis* M.
The Ladak Tortoiseshell.
331 *Vanessa urtica rizana* M.
The Mountain Tortoiseshell.
*332 *Vanessa caschmirensis æsis* Fruh.
The Indian Tortoiseshell.

*333 *Vanessa antiopa yedanula* Fruh.
The Camberwell Beauty.
*334 *Polygonia interposita agnicula* Moore.
The Thibetan Comma.
*335 *Symbrenthia hippoclus khasiana* M.
The Common Jester.
*336 *Symbrenthia hypselis cotanda* M.
The Spotted Jester.
*337 *Symbrenthia niphanda niphanda* M.
The Bluetail Jester.
*338 *Symbrenthia silana* De N.
The Scarce Jester.
*339 *Argynnis hyperbius hyperbius* Joh.
The Indian Fritillary.
*340 *Argynnis childreni childreni* Gray.
The Large Silverstripe.
*341 *Argynnis lathonia issæa* Dbl.
The Queen of Spain.
*342 *Argynnis clara manis* Fruh.
The Silverstreak.
*343 *Argynnis altissima* El.
The Mountain Silverspot.
*344 *Argynnis gemmata gemmata* But.
The Brilliant Silverspot.
*345 *Argynnis pales cupales* Fruh.
The Straightwing Silverspot.
*346 *Melitæa arcesia sikkimensis* M.
The Blackvein Fritillary.
*347 *Cupha erymanthis lotis* Sulz.
The Rustic.
*348 *Atella phalanta* Drury.
The Common Leopard.
*349 *Atella alcippe alcippoides* M.
The Small Leopard.
*350 *Issoria sinha sinha* Koll.
The Vagrant.
*351 *Cynthia erota erota* F.
The Cruiser.
*352 *Cirrochroa aoris aoris* Db.
The Large Yeoman.
*353 *Cirrochroa tyche mithila* M.
The Common Yeoman.
*354 *Cethosia biblis tisamena* Fruh.
The Red Lacewing.

*355 *Cethosia cyane* Drury.
The Leopard Lacewing.
*356 *Ergolis ariadne pallidior* Fruh.
The Angled Castor.
*357 *Ergolis merione assama* Evans.
The Common Castor.
*358 *Pareba vesta vesta* F.
The Yellow Coster.
*359 *Telchinia violæ* Hub.
The Tawny Coster.

(To be continued)

The

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OF THE

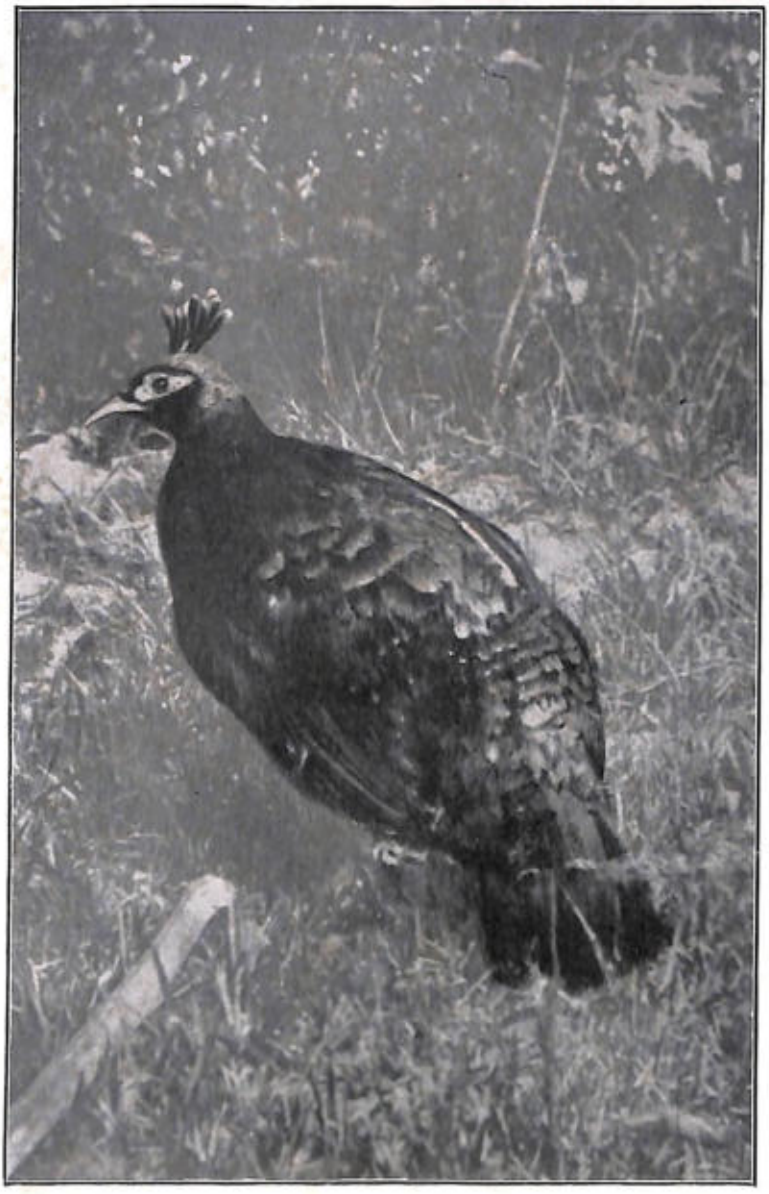
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THE IMPEYAN PHEASANT OR MONAL.

Lophophorus impejanus (Lath.)

Journal

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Game Birds of Sikkim, including the Darjeeling District and of the Jalpaiguri District, Bengal.

By

C. M. Inglis, F. Z. S., F. E. S., E. M. B. O. U.

ZOOLOGICAL GARDEN CALCUTTA

(*Continued from page 6.*)

(*With a photograph.*)

We now come to the genus *Lophophorus*, which contains those gorgeous birds, the Monals or Impeyan Pheasants. Three species occur in India, of which only one is found in our area.

(31) The Impeyan Pheasant or Monal.

Lophophorus impejanus (Lath.)

The feathers of the crest of the cock Monal have bare shafts and the tips are feathered and spatulate. The cock, besides being a fine heavy bird, has most magnificent metallic plumage. Finn's concise description of the cock will suffice.

"The male Monaul has a fine crest of feathers with shafts bare nearly to the tip, where there is a lance-head-shaped webbed portion; it is more or less erect. The crest and the head generally and a streak along each side of the breast are of an intensely brilliant burnished-green; the back of the neck is burnished copper-red, changing to golden-green in some lights; the upper part of the back is bronze-green, the lower silver-white. The latter colour is usually concealed by the wings,

which are metallic purple with metallic blue tips to the feathers. The under-surface of the body is velvety black, and the tail cinnamon." There is also a patch of purple behind the ear-coverts which sometimes extends as a collar across the lower throat.

There are variations in the plumage of the cock in fact, until quite recently, one of these was considered a separate species and called the Bronze-backed Monal. The main difference is that this latter bird has the lower-back bronze and purple instead of white and the underpart glossed with green instead of dead black. The habitat was given as the Chamba State. The extent of the white back however in the normal bird is very variable and so is the amount of gloss on the lower plumage. Quoting from Stuart Baker we find "Variations in tone, tint and depth of colouring are common and aberrant colouration by no means rare, as was shown by Lord Rothschild in his wonderful picture exhibited at the British Ornithologists Club on May 9th, 1917. In the series of skins then shown with this picture were included the most extraordinary aberrations, one bird having a black tail, another the breast and lower parts wholly metallic, another with the interscapulum blue instead of purple, and so on. Semi-albino and melanistic varieties are not rare....."

Cocks measure about 28 inches, with tails 9.5 inches. Weight up to 5 lbs.

The bill is horny brown with tip and edges paler: iris hazel brown: bare space on face smelt blue to turquoise blue; legs yellowish-green or brownish-green. There is a stout spur on each leg.

Finn's short description of the hen will be sufficient:—

"She has the crest of ordinary feathers; she is of a mottle-brown, the light marking tending to run in streaks. Her throat is pure white, and her general appearance is much like that of a huge partridge".

Length about 25 inches, with tail about 8.5. Weight "4 lbs. 11 ozs." (*F. M. Bailey*). The soft parts are duller than in the cock.

We give Stuart Baker's descriptions of the young cock and chick in down.

The young cock "is like the female but has the throat much mottled with black; the upper parts generally have more black and less rufous and therefore appear darker as a whole, and the underparts are much more boldly mottled and barred with black and

rufous with broad white central marks breaking up the latter". The adult plumage is gradually assumed and is complete at the second autumn moult.

The chick has "the crown rufescent chestnut with a central line of black; nape brown, feebly mottled with paler; back chestnut brown with broad lateral streaks of buff; wing and tail quills pale cinnamon buff with blackish pencillings and broad pale central streaks to the inner secondaries; below dirty fulvous buff".

The distribution according to Stuart Baker is:— Afghanistan and the Western Himalayas through Kashmir, Garhwal, Nepal, Sikkim, Bhutan, Chumbi Valley, South Tibet to the Mishmi Hills." Within our area it is now only to be found in Sikkim. It formerly used to be found near Sandakphu on the Singalila Range, and Stevens wrote "It was reported by a competent observer to have been seen on Senchal." He seemed doubtful about this and we think it is not true. Sunder in his Settlement Report gives it as "found between Buxa and Sinchula, but rare". These places, are in the Duars, the former 2,000 ft. and the latter 6,000 ft. in elevation. We have not been able to substantiate this statement. Ludlow, writing on the "*Birds of the Gyantse Neighbourhood*", says:—"This beautiful Pheasant is not uncommon amidst the fine forests and rhododendron scrub of the Chumbi Valley at an altitude of 12,000-13,000 ft. At Chumpithang (the stage between Yatung and the Natu La) it is particularly common." With regard to the elevation at which this bird is found, stragglers have been shot during severe winter weather as low as 4,500 ft and in summer it has been seen as high as 15,000 ft. With us the lowest winter limit appears to be 9,500 ft., where Stevens got it at Karponang in Sikkim and also found it below Guatong in March. In September we found them not uncommon on the hills above and beyond Changu.

As Beebe says, "Monauls are among the most brilliantly iridescent birds in the world."

The Monal is a bird of the high forests. Wilson (Mountaineer), writing about the middle of last century, says:—"In summer, when the rank vegetation which springs up in the forest renders it impossible to see many yards around, few are to be met with except near the summits of the great ridges jutting from the snow, where morning and evening, when they come out to feed, they may be seen in the open glades of the forest and on the green slopes above. At that time

no one would imagine they were half so numerous as they really are; but as the cold season approaches, and the rank grass and herbage dies away, and they begin to collect together, the woods seem full of them, and in some places hundreds may be put up in a day's walk.

"In summer, the greater number of the males, and some of the females, ascend to near the limits of the forests, where the hills attain a great elevation, and may often be seen on the grassy slopes a considerable distance above these limits.

"In autumn, they all descend into the forest, frequenting those parts where the ground is thickly covered with decayed leaves, under which they search for grubs; and they descend lower and lower as winter sets in and the ground becomes frozen or covered with snow. If the season be severe, and the ground covered to a great depth, they collect in the woods which face to the south or east, where the snow soon melts in the more exposed parts, or descend much lower down the hill, where it is not so deep and thaws sufficiently to allow them to lay bare the earth under the bushes and in sheltered places. Many, particularly females and young birds, resort to the neighbourhood of the villages situated high up in the woods, and may often be seen in numbers in the fields. Still, in the severest weather, when fall after fall has covered the ground to a great depth in the higher forests, many remain there the whole winter; these are almost all males, and probably old birds.

"In spring all in the lower parts gradually ascend as the snow disappears.

"In the autumnal and winter months, numbers are generally collected together in the same quarter of the forest, though often so widely scattered that each bird appears to be alone. Sometimes a person may walk for a mile through a wood without seeing one, and suddenly come to some spot, where, within the compass of a few hundred yards, upwards of a score will get up in succession. At another time, or in another forest, they will be found dispersed over every part, one getting up here, another there, two or three further on, and so on for miles.

"The females keep more together than the males; they also descend lower down the hills, and earlier and more generally leave the sheltered woods for exposed parts or the vicinity of the villages on the approach

of winter. Both sexes are often found separately in considerable numbers. On the lower part or exposed side of the hill, scores of females and young birds may be met with, without a single old male; while higher up, or on the sheltered side, none but males may be found. In summer they are more separated, but do not keep in individual pairs, several being often found together".

Wilson wrote in the days when the monal was particularly common but now, alas, largely due to the great demand for the brilliant feathers of the cock, these numbers have been greatly decimated; still, in the remoter parts of their habitat or where less persecuted, they may still be commonly seen.

Monals have thick sturdy legs set widely apart; these are not used for scratching, as do other pheasants, but wholly for walking purposes. The bill is massive and is made good use of in digging for tubers, grubs, etc., and for splitting the harder tubers, etc. Besides these, they feed on roots, leaves, young shoots of shrubs, acorns, berries, etc.

They apparently don't use their legs as much as so many of our pheasants do. The flight is strong, especially as he hurtles down the hillside. Hume says:— "There are few sights more striking, where birds are concerned, than that of a grand cock shooting out horizontally from the hill-side just below one, glittering and flashing in the golden sunlight, a gigantic rainbow-tinted gem, and then dropping stonelike, with closed wing, into the abyss below".

Wilson writes:—"From April to the commencement of the cold season, the Moonal, though there is nothing of cunning or artifice in its nature, is rather wild and shy, but this gives way to the all taming influence of winter's frosts and snows; and from October it gradually becomes less wild until it may be said to be almost tame.....

"In spring it often rises a long way in front, and it is difficult to get near it when it again alights if it does not at once fly too far to follow, but in winter it may often be approached within gun-shot on the ground, and when flushed it generally alights on a tree at no great distance, and you may then walk quite close to it before it again takes wing.

"In the forest, when alarmed it generally rises at once without calling or running far on the ground; but on the open glades or grassy slopes, or any place to which it comes to feed, it will, if not hard pressed,

run or walk slowly away in preference to getting up.....

"It gets up with a loud fluttering and a rapid succession of shrill screeching whistles, often continued till it alights, when it occasionally commences its ordinary loud and plaintive call and continues it for some time".

Beebe says:—"The common call note is a shrill, loud whistle, with but little cheeriness.....when.....a cock Impeyan is suddenly alarmed, so that it leaps into the air and whirrs away; it pours forth from wide-open beak a rapid succession of shrill, screeching, whistling notes which can be heard at a surprisingly great distance. These can be considered only as multiplied, intensified, terror-induced modifications of the common call note Weeeep! Weeeep! Weeeep! Weeeeeep!"

We have watched a cock calling from a branch, in captivity. He first of all uttered a low chuckling whistle, then stretched out his neck and raised his head, fully spread his tail and uttered a loud whistling note.

A hen also called but the note was not so loud. Beebe says the call of the young "is appreciably shriller and higher than that of their mother.....The mother note of the Impeyan is low and subdued: a crooning, nasal untranslatable sound, while the chicks have a whistling chirp that merges, with but little change except of depth and volume, into the call of the adult Impeyans",

Major Rodon observed a wild bird displaying and wrote as follows:—"When shooting in the Himalayas this April I noticed early one morning, while sitting behind a tree, a pair of Moonal Pheasants feeding a short distance from me, on a flat terrace on the open hillside. They were so close that I was able to see their every movement distinctly. After being busily engaged for some time in their usual digging operations, the hen bird stopped work and uttered her call note several times, upon which the cock, who was at the time some little distance away, ran up to her with his wing raised high above the back, tail spread and neck and body feathers distended. He then moved quickly to and fro for a few seconds in front of the hen, who stood quietly looking on at his performance; he then abruptly closed his wings and tail, turned about and ran back to his feeding ground while the hen went on with her breakfast. As the early morning sun was shining on the birds, the sudden appearance of the cock in the above performance was most splendid to look upon: the beautiful metallic hues of the wings and throat, with the

pure white of the back and the chestnut coloured tail, spread like a fan behind, shone out most gorgeously. I believe, in all courting displays among birds of fine-coloured plumage, the hen takes a most passive part, and does not in any way call the performance up; but the male birds themselves of their own accord go through the ceremony of shewing off their fine feathers in front of their lady loves. But in this case the lady, by her calls, appears to have directly invited or encouraged the display, as the lover was digging out his breakfast until he heard the call sounded".

Mr. Seth Smith writes to the Avicultural Magazine about a bird displaying in captivity. He "lowered both wings, stiffened the copper-red feathers on his neck to look like a small ruff, drew his bill under his chin so as to display his crest better, and then crept round a grassy mound to look if the hen was observing him.

"Finding this to be the case, he crouched low on the ground, dropped his wings even further, and spread out his tail into a fan shape as far as it would go—which was a long way. He then suddenly raised his tail upwards and bristled up all his feathers, the head being lowered near the ground. He next lowered his tail, still keeping it spread out fan-shape and commenced such a loud rattling and rustling of all his feathers (accompanied by a plaintive whistling) that I could scarcely believe it was the bird making so much noise. He then closed his feathers, except the tail (which he still spread to its utmost extent), and gave several froglike leaps forward in the direction of the hen, stopped short, jerked himself suddenly right-about-face, gave a flourish of his fan-tail in front of the hen, suddenly closed his tail, and then ran away." Bailey saw one display at the end of October; the tail was pressed down.

They roost on the branches of trees. Beebe found old cocks roosting alone but one observer told him "of seven birds, all in female plumage, which in the autumn roosted regularly in a clump of rhododendrons, in three groups of two, two and three respectively, doubtless three hens and the young birds of the year." Beebe, writing about their roosting in rocky country, says:—"I have found that they invariably choose the protected—south or south-east—side of some steep cliff or outjutting mass of rugged boulders, and there roost in the niches well up on the precipitous face".

With regard to the enemies of the Monal, man seems to be the principal one or was until recent years.

Hume wrote in 1879:—"The great demand for the brilliant skins of the Moonal, that has existed for many years, has led to their almost total extermination in some parts of the hills, as the native shikaris shoot and snare for the pot as well as for skins, and kill as many females as males. On the other hand, though for nearly thirty years my friend Mr. Wilson has yearly sent home 1,000 to 1,500 skins of this species and the Tragopan, there are still in the woods whence they were obtained as many as, if not more than, when he first entered them, simply because he has rigidly preserved females and nests, and (as amongst English Pheasants) one cock suffices for several hens". Stuart Baker thinks this is feasible and that "when the trade is properly organized and the female, young and eggs efficiently protected, the plumage of the males may be exported in great numbers without any harm being done". But is it possible under present day conditions, when nearly every man possesses a gun, to adequately protect game? We doubt it. Beebe, writing about Hume's remarks, says:—"Ignoring the uncertainty of the last statement, it is rather absurd to think of a single man preserving females and nests in the Himalayas, as in the years 1850 to 1880, when the British Government, despite most efficient laws and worthy efforts, is unable to protect the birds of these wild regions today. The statement that, after thirty to forty-five thousand cock Impeyans were shot and snared, as many or more than the original quota remained, could only emanate from the mind of a professional feather hunter, and Hume should not be blamed for more than the mere repetition of such figures." He goes on to say "that at one feather sale in London, in 1904, six hundred and forty-eight Impeyan skins were sold".

The principal natural enemies of the Monal are, according to Beebe, the Golden Eagle, Bonelli's and the Spotted Hawk-Eagle, and also the Goshawk. As to animal foes he mentions "Lynx, leopards, foxes, wild dogs, beech martens, weasels and langurs. He writes about the latter:—"As I came over the ridge a long-tailed grey form leaped from the undergrowth up a bare, half-fallen tree trunk, and ran along it on three legs, holding something clutched in one hand. I suspected something was wrong and ran headlong at the great monkey, who promptly dropped the object and fled from tree to tree, swearing roundly at me the while. A glance at the nest showed it to be empty, and several

minutes search beneath the dead tree revealed one of the eggs, with a great gaping hole in one side, through which the yolk still dripped."

As table birds there is much difference of opinion and it appears that whether they are good eating or not depends a good deal on the time of the year they are shot and what food is available then.

The Monal appears to breed principally between May and June, as late as July at the higher and the end of April at the lower elevations. The lowest elevation at which they have bred is 7,500 ft. and they breed up to 14,000 or 15,000 ft.

No nest is made: only a depression is made by the bird in the ground. Beebe found two nests in close proximity but at the present day this is unusual. They lay their eggs in forest, according to Whymper "in forest consisting of big trees but not with very thick undergrowth. Indeed, I have more than once taken them in places where the growth was so light one could walk in comfort except for the fact that the ground was much broken. The nest is a mere scratching in the earth, generally hollowed out by the bird itself, under the shelter of a big bush, the bole of some large forest tree or, perhaps, a rock." They lay from three to five eggs. Hume, writing about the eggs, says:—"The eggs in shape and size closely approximate to those of our domestic Indian Turkey, but are, as a whole, slightly larger....." Stuart Baker says:—"In colour the eggs vary from a very pale dull yellowish stone-colour to a fairly warm buff. Some eggs are freckled all over with minute specks and small blotches of reddish-brown and with secondary markings of grey and pale purple, not noticeable unless carefully examined. Other eggs have the blotches larger and more sparse and are quite handsome eggs." He gives the average of fifty-eight as 64.7×44.3 mm.

Beebe says:—"The first mention of these birds laying and hatching in captivity is in the years 1854 and 1856". According to him no great success has been got with rearing these Pheasants in captivity but we were told by Monsieur Delacour that he hoped to be able to stock some of the French forests with them. A cock bird, in Bailey's fine aviary at Gangtok in Sikkim, was rather shy but the hens were not. A cock Elwes' Eared Pheasant (*Crossoptilon harmani*) nearly killed it and another cock Monal nearly completed the murder Eggs were laid in this aviary on the 14th, 17th and 22nd April.

Notes on the Natural History and Shikar of Indian Deer.

By

Colonel H. S. Wood, I. M. S.

(*Continued from page 24*).

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8. The Sikkim Stag.

The native name for this deer is *Shou*. I have never shot or seen this animal. I saw some fine horns, I think adorning the walls of some Hotel in Darjeeling. Judging from the size of the horns it must be a magnificent animal something like the Wapiti. In the war against Thibet one of the officers secured a hind but I do not know what became of it. It would be interesting to hear more about this annimal from sportsmen who have had the opportunity to hunt them.

[We can find little about the Shou (*Cervus affinis* Hodgs), erroneously sometimes called the Sikkim Stag. It is not, so far as we know, found anywhere in Sikkim but is in the Chumbi Valley, although Blanford says it is not. The type locality, as a matter of fact, is given as "Chumbi Valley" and it is also found elsewhere in Tibet and in Bhutan. The Tibetan name for this deer is *Sha*. As there is so little known about this fine animal, we quote *in extenso* two notes by Lt.-Col. Bailey from the Journal of the Bombay Natural History Society (*Vol. XX, p. 1031 & Vol. XXIV, p. 73*):—"These Stags are found in the Chumbi Valley, their lowest elevation being about 9,000 feet. They are very scarce, a few only crossing the ridge which forms the boundary between Chumbi and Bhutan. I have seen them grazing on Lingmotang Plain in May, when the stags had no horns, and in the winter they are to be found in the dense pine forests on the Eastern side of the Chumbi Valley; but about December the forest is disturbed by the villagers, who at this time are collecting their winter's supply of fuel, and the stags appear, for the most part, to return Eastwards to Bhutan. They rarely cross the western bank of the Ammo Chu and this river may be said to be the limit of their habitat on the west.

I saw in captivity at Shigatse a stag which belonged to the Tashi Lama, and which I was informed had been obtained from the Brahmaputra Valley, east of Lhasa, but I am unable to say to what species it belonged. I found that the roofs of many houses in Tibet north of Nepaul were adorned with stag horns which, I was told, had been brought from the north, but as the country is bare desert for hundreds of miles in that direction, I think it possible that these horns came from Nepaul. I was unable to bring any horns away, as they had become too brittle from exposure to the weather, and in spite of the greatest care broke in pieces after a few marches".

The same writer in "Notes from Southern Tibet" in the same Journal writes:—

"A specimen with horns in velvet was shot at Chösam in the district of Tsari at about 15,000 feet elevation on the 12th September 1913. Mr. Pocock's note on this specimen, which proved to be a young one, appeared in the "Field" for 3rd October 1914. The measurements were:—Head and body 67½"; tail 3"; ear 8½"; height at shoulder 40". Others were seen south of the Tsari range on the marshy plain near Simoneri. In this part of Tibet this stag is very local in its range, and appears only to exist in the upper valleys in the holy district of Tsari; further down the valley at Migyitüm (9,630 feet) the forest was very thick and we were told that the Shou was never found there. They occasionally cross the ranges into the valleys to the west, but do not stay there permanently. I found a pair of shed horns which measured 58". A stag was said to occur in the forests on the hills above Pe in Kongbo Province, and they are common at Gymda, a town some distance north of our route, which we did not visit. I saw horns in the villages of the Loro Karro Valley which were said to have come from the high bare country north of Tsöna, but stags had not been seen in this part of the country for many years, and we could hear nothing of them in the Dungkar Valley in the west, the only ground in the vicinity which appears suitable."

Rowland Ward (*Records of Big Game*) gives the following measurements—

Length on outside curve	Circumference	Tip to tip	Widest inside	Points	Locality	Owner
55¾	6½	17¼	40⅜	7+6	Tibetan Frontier	British Museum (Hume Collection).
55¾	6⅞	26⅛	44	5+5	Do.	British Museum (B. H. Hodgson).
54 ⅜	6⅝	21⅝	37¼	5+5	Do.	British Museum (Dr. Campbell).
54¼	7¾	10¼	35½	5+5	Do.	H. M. The King.
53¼	6⅞	30	45¾	4+5	Do.	British Museum (Hume Collection).
52	8	...	...	...	Do.	Lord Rothschild.
50¾	6¾	17	34¼	5+5	Do.	British Museum (Mrs. Claude White.
50	6¼	21⅜	35¼	8+6	Do.	The late H. J. Elwes.
48	6⅜	17	34½	6+5	Do.	H.R.H. the Duc d'Orleans Collection.
47⅞	5⅝	30⅜	40½	5+5	Do.	British Museum.
46	5⅞	25	36¾	5+5	Do.	British Museum (Lt.-Col. A.deC. Rennick).

Owner's Measurements.

52½	7	18½	38	5+5	80	Sir Edmund G. Loder Collection.
52	8	...	...	3+3	Do	Maj. Gen. Sir Edward May.
49½	...	39½	...	5+4	Do	Bombay Natural History Society.
48	6	30	42½	5+5	Chumbi Valley.	The late Earl Curzon of Kedleston.

The measurements of the other horns to which we have access are the following in the collection of the Indian Museum.

No.	Locality	Donor	Year	Basal length of skull	Breadth of skull	Length of horn	Circumference	Widest inside	Tip to tip	Points
1	Near Phari, Tibet	Sir A. Eden	1882	17.25	6.25	43	7	41.25	46.25	5×6
2	Near Dhoulagiri, Tibet	Barrackpore Menagerie	1856	?	?	42	6 25	...	...	...
3	Near Phari, Tibet	A. Campbell	1851	16.75	5.75	37.75	6.75	36.75	40.25	5×5
4	Sikkim	J. Mandelli	1877	?	?	46.75	5.75	37 25	20	5×5

Mandelli's horns must have come from the Chumbi Valley, Tibet. There is a single horn in the Bombay Natural History Society Museum presented by Lt. R. S. S. Shuttleworth. It measures 46½″ with a circumference of 9½″ and has 4 points.

Colonel Ward says:— "Compared with the Kashmir Hangul the skull of the Shou is very much larger: the Hangul's skull is in extreme length from 15½" to 16", whilst the skull of a Shou is 17½" and Blanford gives a measurement of 18½".

"Judging from the comparatively few antlers about whose identity there is no doubt, the number of points are like the Kashmir Stag, normally 5+5 in number: but one of Mr. Hume's specimens was 7+6 and Rowland Ward gives two others as 8+6 and 6+5. Again, Lydekker mentions a head with 13 points from a valley not far from Lhassa.

"The Shou is amongst the largest of the Red deer. The antlers are not unlike those of the Hangul; the beam bends forward from the trez tine and the shape of the beam is not unlike that of the Spotted deer".

In colour the Shou resembles the Kashmir Stag, which is the next to be discussed. The young are sure to be spotted, as they are in the Kashmir Stag. Editor].

Hog Deer in the Duars.

Last year, in the June issue of the Journal, Col. Wood subscribed a long and interesting article on the Hog Deer. Since that time I have had exceptionally good opportunities of observing the Hog Deer in our own Duars jungles, for, during the past six months, duty has taken me through all parts of the Torsa jungles, from the Bhutan Frontier in the North to the boundary of Cooch Bihar in the South. Here I have met with Hog Deer in varying numbers almost daily.

I would like to make the following comments on Col. Wood's article:—

(1) With regard to the Hog Deer's alarm cry, I can fully support Mr. F. W. Champion's remarks in the January issue of the Journal. In the Duars, at any rate, the call is freely sounded by both sexes when alarmed. Usually it consists of a single sharp whistle, which cannot be confused with the call of any other of our deer. The sound made can be imitated fairly accurately by a single whistle from the unaided human lips.

Occasionally the usual "high piercing whistle" is followed by three or four short half notes in the same

key, the latter being jerked out with each leap as the animal bounds away, often uttering the initial call.

I have had the alarm call made for me many times, both when on foot and on an elephant, and often with the deer in full view at the time. At night the alarm is sounded for a tiger or leopard, or for a man. It is a sure sign that something is on the move. I have never heard a mating call.

(2) Though Hog Deer are plentiful in many parts of the Torsa forests, I have never yet seen a proper "herd". I have often seen companies of 10 or 12 animals together, and in May I once came on nearly 30 on about 3 acres of burnt grass jungle near Madarihat. However, either when feeding unaware of danger or when bolting for cover, in every case the animals were much too individualistic in their movements to suggest a true "herd". I think Mr. Champion's description of U. P. Hog-Deer as "quasi-gregarious" applies splendidly to our Duars animal. They never associate into a complete gregarious unit like the Chital or like the Fallow deer in an English Park.

I see that an albino Hog Deer has been recorded from Cooch Bihar.

While stationed in the Apalchand Forest in 1931 I received a number of reports (some of them from very reliable sources) of meetings with a mysterious white deer in the forest to the west of Mechbasti. I was never lucky enough to meet this animal myself but after careful enquiries I was convinced that this "white deer" really did exist. The accounts of four or five witnesses who saw the deer at different times were very emphatic and consistent, and from these descriptions I think that the animal was undoubtedly a female albino—and probably a Hog Deer.

Although at the present day very little grass jungle remains in the Apalchand, Hog Deer are found in small numbers throughout the Sal forest. In this forest they have probably changed their habitat to a certain extent owing to Sal regeneration having filled up most of the grass jungle during the past 20 years.

I should be glad to hear further news of the Mechbasti "white deer". If Dam Dim sportsmen who visit the Apalchand will make enquiries, I think it is very likely that they will get further interesting *khubber* and eventually one day the mystery may be solved.

Chilapata,

17th July 1932.

T. V. Dent,

I. F. S.

Wild-dogs.

I was very interested in Mr. T. A. Baldry's note on wild-dogs printed in the April number of the magazine.

I believe that many sportsmen tend to jump too rapidly to the conclusion that the appearance of wild-dogs in a forest tract is a signal for the departure of all other animals. This may happen sometimes where the local ungulates are not accustomed to the presence of wild-dogs but it certainly is not always the case. In Belraien range of N. Kheri forest-division in Oudh one or more packs of wild-dogs, totalling 20 or more in number, have been *living permanently* for a number of years and yet the number of sambar, chital, gond, para, kakar and pigs are just about the same as in other ranges where the dogs do not go except on flying visits. Personally I believe that wild animals are largely fatalists and think of danger only when it is actually in front of their eyes or noses. Obviously this particular area offers considerable attractions to deer and even the continued presence of such dangerous animals as wild-dogs does not drive them away, although vast areas of the plains forests of Nepal march with the range in question.

Only last Xmas a shooting party arrived in these forests and one of their buffalo-baits was killed by wild-dogs the first night. The party therefore decided it was quite useless to stay on and departed the following day, although personally I believe that they would have enjoyed good sport from tiger downwards had they given the area a fair trial.

It is one of the well-worn traditions of Indian shikar that wild-dogs drive all other game away; but these dogs must live somewhere and it seems probable that they would choose places for their dens and the upbringing of their families where food is plentiful. If all game departed on their arrival in a particular spot, the parent dogs would be very hard put to feed their families. Actually, only a short time ago I watched a pack of wild-dogs playing on a straight fire-line. A short distance away, in full view, in one direction a number of pigs were digging for roots and in the other direction three sambar hinds were browsing unconcernedly. All these parties of animals were in full view of each other and all seemed indifferent to the presence of the others.

My point is that wild-dogs do not necessarily drive away game to the extent that is usually stated and

Mr Baldry's note confirms this belief of mine—although I admit that it is contrary to the usual ideas on the subject.

Naini Tal, F. W. Champion,
15-6-32. I. F. S.

Deer and Wild-dog fraternizing.

I was very much interested to read in the Journal Mr. T. A. Baldry's remarks on Wild-dog and Deer fraternizing. He kindly asks for an opinion and I am glad to give it for what it is worth. I think the Sambhur did not stampede, as they knew that union is strength. So long as they kept together they could easily keep wild-dogs off, especially as there was a stag to help them. Once dispersed, a single one would be selected and chased down and killed by the dogs. The Wild-dog is a skunk like the Pi and has no pluck. They do not like their quarry taking to water, so would not deliberately drive them towards it to kill. A doe Sambhur could break the back or the skull of a Wild-dog with a stroke downwards of her forefeet.

I have seen two does standing in water with a fawn keep a pack of twenty or twenty five dogs at bay.

Another thing is that these dogs were driving the deer in the direction where the main pack was concealed. I have seen a Wild-dog lying low at the top of a nullah whilst others were driving a deer towards it. It is well known that even a Tiger fears to attack a tame herd of Buffalo and, when one is scented, they keep close together for mutual protection.

Wildbad, H. S. Wood,
Black Forest, Colonel, I. M. S.
Germany,
26th June 1932.

The Bora Cheng (*Ophiocephalus amphibius*, McClell.)

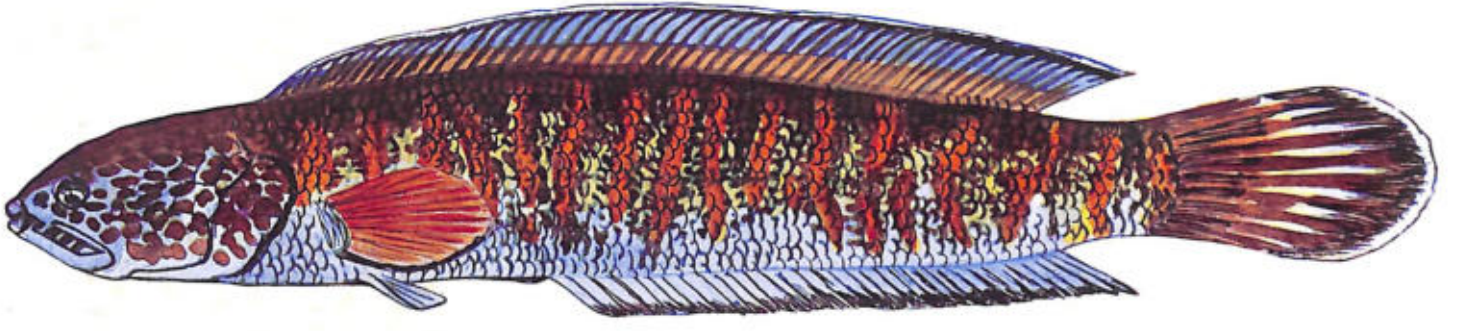
(With a coloured plate and photograph.)

By

E. O. Shebbeare

The discovery, or rather rediscovery, of this interesting fish was due to Dent, who had already told us during last rains that, according to the Mech villagers of Apalchand Forest, there was still another species of *Ophiocephalus* which they had not yet been able to show him. It is noteworthy that it was found in the "Chail" (= Chel) river, which flows past the Apalchand Forest, by Russell of the Bengal Civil Service 90 years ago. Later in the cold weather, and luckily when Shaw was in camp with me, Dent wrote to say that he had got a live one about eighteen inches long and that it was gorgeously coloured. None of us had expected anything like this. To begin with the Mechs had told Dent, quite correctly, that the fish lived in holes and at the bottom of wells and they had described it vaguely as "red". He had pictured the red of this dweller in darkness as an unwholesome pink rather than gorgeous orange, while the brilliant blues and greens had not been mentioned at all. Up to this time Shaw and I had not seen the fish but it seemed extraordinary to us that the existence of such a large and brightly coloured fish could have escaped notice for so long. We were also completely at a loss to place it among the species of *Ophiocephalus* described in Day's "Fishes of India". Fortunately we were not far from Apalchand and, as we were moving eastwards in a few days, we arrranged to meet Dent with his fish at Udlabari, near the north end of his forest. Here we duly met and, although Dent had been unable to keep the eighteen-inch fish alive and so had to pickle it in formalin, he had a smaller one, about nine inches long, wrapped in wet leaves on the carrier of his motor bicycle. These fish, being provided with air sacs in the head, are adapted to live for a long while out of water and, when we slipped it into the largest size of glass accumulator jar half full of water which we had on the lorry with us in readiness for the eighteen-inch specimen, it hardly appeared to be even relieved at getting back to its native element but seemed to take it all as a matter of course.

On getting to our halting-place Shaw set about identifying the fish and found that it agreed best,



Ophiocephalus amphibius McClell.

THE BORA CHENG.

in counts though not in colour, with a species described as *O. amphibous* by McClelland from the Chel in 1845. This species was subsequently united by Day with *O. barca*, with which, however, it does not agree. Day's larger work on Indian Fishes gives some references to old Journals of the Asiatic Society of Bengal, from which we got much interesting information and from which we concluded that, in spite of discrepancies in the colour descriptions, we were dealing with the same species that McClelland described nearly ninety years ago and probably the same that Hamilton-Buchanan noticed in Goalpara (but did not describe) over a hundred years ago.

It is evident that McClelland described *O. amphibius*, which he called the "Bura Chang or Boutan Ground Fish", from dead specimens sent him by Russell, for although he mentions the colours in life these are not very convincing and suggest the possibility of second-hand information. Like some other species of *Ophiocephalus* the Bora Cheng loses his brilliant colouring almost immediately after death.

In the hope that this species may not be lost sight of again, we have written out a full description and made a full-size water-colour drawing from life of the smaller of the two fish. The drawing was rendered difficult by the iridescence of the blue and green and by the liveliness of the fish.

The Mechs, Dent tells us, collect the young of this fish on flooded paddy-fields during the rains and put them into their village wells, where they leave them to grow big. They are also found in muddy holes in small streams.

We here append a full description of this fish and the vernacular names.

Vernacular:—*Bora-Cheng* Mechi:—*Borna*. Rabha (Garo).

(Note:— Day in "Fishes of India" gives under *O. barca* "*Bora chung*," Russell, J. A. S. of Bengal VIII, 1839, p. 155)."

D. 51. P 17. V. 1|5. A. 34. C. 14. L. l. 78. (Note:— Day gives for *O. barca* C. 19. L. l. 60-65 and for *O. amphibius* L. l. 80).

Length of head, 4.6 and height of body 8 in the total length. Barbels:—a pair of small, retractile, rostral barbels as usual in this genus. Teeth in jaws and on palate. Fins:—Dorsal long and spineless. Anal similar though shorter. Ventral thoracic, outer ray unbranched,

2/5th length of Pectoral. Lateral line with no very abrupt downward curve but irregularly stepped down below the 7th to below the 16th dorsal ray. Scales from orbit to angle of pre-opercle—10, between snout and base of Dorsal—16.

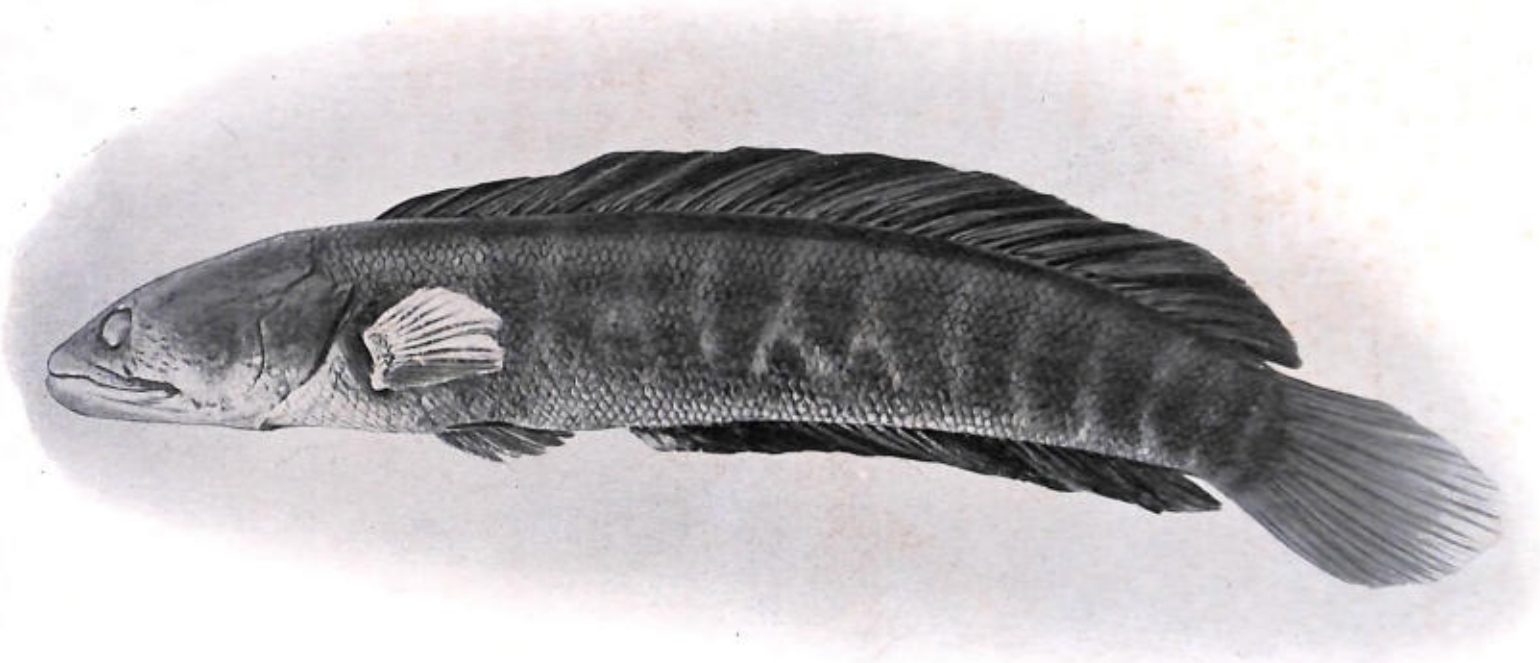
Colour:—A gorgeously coloured fish. The ground colour is blue when viewed obliquely and iridiscent green when viewed at right angles to the surface. On the body this colour is sprinkled with dark spots, uniform in size but irregular in shape. These spots are absent from the belly, sparse below lateral line and increasingly plentiful towards the back where they coalesce On the heads the spots are larger and rounded, rich brown below the level of the eye and becoming darker and more plentiful towards the top of the head where they coalesce. The brightest blue (green) and richest brown are in the region of the upper lip. Along the body are 13 to 16 more or less irregular vertical bands about equal in width to the interspaces between them and extending from dorsal to below lateral line. These are bright orange bordered with brown and merging into brown on the back and are free from dark spots. Dorsal has basal half brown or orange, outer half blue (green) darkening outwards but having a narrow, pale blue or white edge Pectoral deep orange. Ventral blue. Anal iridescent. blue (green) with a narrow dark border. Caudal brown at the base, then iridescent blue (green) with dark rays, then blackish with a narrow white or bluish-white border.

"Description of four species of Fishes from the Rivers at the foot of the Boutan Mountains. By J. McClelland. (Journal Natural History Calcutta V.(1845) pp. 274—278)

"Mr. D. C. Russell, of the Bengal Civil Service, favoured me with a species from the same quarter which has been noticed, p. 427. Vol. 1.

"It remains upon the present occasion to describe three species subsequently received from Mr. A. Campbell, and which would have been noticed earlier but that I have been waiting in hopes of receiving a regularly selected collection from that quarter, such as might afford materials for a paper on the subject, of suitable interest and importance.

"Before going further, it is necessary in the first instance to offer a few remarks on Mr. Russell's specimens of the Ground Fish of Boutan, or, as it has



Ophiocephalus amphibius McClell.

THE BORA CHENG.

been called, inaccurately I suspect, the *bara Chang*. This species belongs to the same well known genus, with a small fish known in some parts of Bengal under the native name *Lata*, in other places called Chang (*O. gachua*. E. O. S.). The Boutan Ground Fish is so much like the *Chang* that ordinary observers would only distinguish it as considerably larger, hence I conceive the term *bura Chang* to be only a corruption of the word *bura* (large) Chang. (It is Bora, a Mechi word, not Boro—burra: big. E. O. S.). In my former remarks on the subject, the species was considered to be the same as *Ophiocephalus barca*, Buch. I now consider it to be a distinct species, which may be named and described as follows:—

Ophicephalus amphibeus, (J. M.) vol. i. pl. xi. f. 3.

Bura Chang.

In addition to the general characters of the genus, the fins are dark and the sides marked with twenty-four alternately dark and whitish transverse bars. The length is equal to eight diameters of the body taken at the pectoral fins. The ventral fins are small and soft, the dorsal and anal broad, the former commencing on the back just above the pectorals. The fin rays are

P. 14: D. 48: V. 5: A. 34: C. 13.

When alive, the dark sombre colours are relieved by minute dots of vermillion and smalt blue, dispersed indiscriminately over the upper parts of the body and sides, more particularly about the head.

This species is very nearly allied to *Ophicephalus nigricans*, Cuv. et Val. from which it differs in containing two rays less in the dorsal fin.

When noticing this subject on a former occasion, vol. i. p. 427, the circumstance of Buchanan Hamilton having twenty years ago announced the fact of certain species of this genus inhabiting holes in the perpendicular banks of the Bramaputra, near Goalpara, was pointed out. The holes, he says, were those frequented by certain birds, and consequently raised high above the water. Other species of this genus (says the same author) are found on the grass after heavy showers of rain, and that too at a distance from water, so as to be reckoned amongst those fishes which the natives of India, together with many Europeans, believe to fall from heaven with rain.—See *Gangetic Fishes*, pp. 67-8.

As to the species here described, Mr. Russell observes that it is found in the vicinity of the Chail river, one of the tributaries of the Teesta at the foot of the Boutan mountains; sometimes it is met with as much as two miles from the bank of the river, where it penetrates into holes in the ground. From these it probably emerges when the ground is inundated during heavy rain, like the species of this genus so frequently found on the surface of the earth, as if they had fallen from the clouds.

The natives of Boutan (he refers to the Mechs and Rabhas no doubt—then the inhabitants of the Duars, which was part of Bhutan at that time. E. O. S.) know so well the ground in which to find these fish that they dig them out from their holes in the following manner:—a stick is passed into the suspected hole and the earth raised sometimes to a depth of nineteen feet. When water makes its appearance the operations are suspended and a little cow-dung is dropped into the well, when they are easily secured. They are said to be usually found in pairs, each fish weighing about 4 lbs., and sometimes as much as two feet in length.

Such is the account given of the habits of this species by Mr. Russell, and I have already adverted to the statements of Buchanan Hamilton on the same subject, together with the popular opinion of the people of the country and of Europeans, forming together a body of evidence not to be questioned.

Dr. A. Campbell, Superintendent of Darjeeling, in a paper (in the xi. vol. Jour. As. Soc. p. 963) which I only refer to for the inadvertence with which it is written, without consulting the opinions of others, seems to regard the foregoing account of the habits of the *bura Chang* as if it were calculated to excite (to use his own words) either "an unenquiring and implicit credence or wonder, without any lasting impression of the matter narrated, or sceptical disbelief".

In a recent visit to Boutan, Dr. Campbell states that he learnt on enquiry that the *bura Chang* is not found on the right bank of the Teesta.* It inhabits jheels and slow running streams near the hills, living principally in the banks, into which it penetrates from

* This, if not depending on some local cause, which ought to have been stated, would be far more incredible than anything else that has been advanced upon the subject.

one foot to six. The 'tubes' leading from the water into the banks are generally a few inches *below* the surface of the water** and are consequently filled with water, and terminate in a basin where the fish remains. The usual mode of catching them is by introducing the hand into these recesses under the water; two fish are generally found together, and they lie coiled up horizontally like a wheel. It is not believed that they bore their own holes, but that they occupy the abandoned locations of land crabs. When in the water pools or streams, they always remain close to the margin and constantly move out and into their holes. "They never leave the water, nor can they move on grass more than any other fish".

Under an impression, perhaps, that no fish are formed to live out of water, Dr. Campbell may have thought it necessary to obtain the foregoing information, in order to reconcile with his own views what appeared to him to be an exception to a general law of nature. But there are eight genera of the same family of fishes to which the *bura Chang* belongs, all specially formed for an amphibious mode of life. They constitute what Cuvier calls the family of *Labrynthiform Pharangeals*, from the circumstance of their pharangeal bones being formed into a kind of honeycomb for the retention of a supply of water to enable them to live in dry places.

* * * *

Hence we see that Mr. Russell's account of the *bura Chang* is only in accordance with the known habits of the family to which it belongs and, however extraordinary it may seem, does not require to be bolstered up by any such explanations as those of Dr. Campbell. Nature herself is the best monitor in such cases. Mr. Pearson, in communicating Mr. Russell's account of the *bura Chang* to the Asiatic Society, considered it to be of such a novel* nature as to deserve on that account the peculiar attention of that learned body. Now as to the novelty, which the Society took for granted!

** This we should suppose would depend on the season and state of the river, as hill streams rise and fall so continually that they never can be said to have any fixed level.

* Journ. As. Soc. Ben. 1839, vol. viii, p. 551, and Cal. Jour. Nat. Hist. vol. i, p. 427.

"What is most astonishing," says Baron Cuvier, "and what some naturalists of the present day ought to be ashamed of, these habits were known to the ancients."

Theophrastus, in his Treatise on Fishes which live without water, says that there exist in India certain fishes which leave the rivers for a time and return to them again; that they resemble those which the Greeks call mullets. "There may be some doubt," says Baron Cuvier, "as to whether this refers to our *Anabas* or rather perhaps to *Ophicephalus*, which both have the head broad and obtuse, and covered with scales as the mullets."

[Since the above was written, Dr. S. L. Hora, of the Zoological Survey of India, has written to me as follows:— "*Ophicephalus amphibius* should be called *O. barca* H. B. Buchanan in his account of the fishes of the Rungpur District remarks that 'The *Borka* of Goalpara is still another nearly related to the above; but its colours and manners are very different. It grows to about three feet in length, and is a very ugly lurid animal, although it has a variety of strong and bright colours. It is thought very good, but although much sought after, is rarely caught. The reason assigned for this is that it lives either under rocks, or forms holes in the banks in which it contantly resides, and only puts out its head to procure food, so that it cannot be taken by a net. It is said to be caught with a trap made of wide hollow bamboo, one end of which is placed against the mouth of the hole, and a bait of oil-cake is fixed to a spring some way up the bamboo. The fish enters to eat the oil-cake, and lets loose the spring, by which a valve shuts behind and prevents a retreat'. Day figured a specimen from Calcutta under this name in his *Fishes of India* but that is obviously a case of wrong indentification". *Editor*].

Note on Barilius bola.

Before receiving Vol. VII, No. 1 of our Journal I had completed an article on Fishing in India, which I hope to send our Editor.

In this I have described what I know of this fish. With reference to F. R's. request in the Journal above mentioned, I am writing to say that this fish is common in the Assam rivers. It is very sporting and is a strong fish. It leaps out of the water when hooked like a Rainbow trout; they move in shoals and if one is caught several others are sure to be secured.

I have never found them in rocky or rapid streams; the place where they are to be looked for is where a stream enters the main river and the bed must be sandy. The Sylhet district where the Rowai river enters the Hurry is a good place. The mouth of the Borelli as it enters the Brahmaputra and the Sona Rupa and Gabru in the Darrang district are also good spots. They take a small fly spoon but the best fly is a quill body and Florican hackle. I once pulled out five, one after the other, with this fly in the Rowai. The fly should be Lake Trout size and not too small.

There are lesser Barils in the Assam rivers: pretty little chaps beautifully marked with blue patches and stripes. They give good sport on a light rod and tackle and chelwa flies and make excellent eating. The Baril is a very shy fish, so one must keep far away from the spot when casting. In shape he is just like a trout.

My article will be accompanied by a photo, which I hope readers of the Journal will see.

Hotel Belvedere.
Orta St. Giulio,
Italy.

H. S. Wood,
Colonel, I.M.S.

Leeches and Planarians Compared.

By J. Percy Moore.

The incentive to this little article came as a request to your Editor from a member of the society for information on the distinctions between planarians and leeches. This request is amply justified, for the animals of those two groups are very generally confused, not only by persons of no zoological training but even by good zoologists whose interest has been limited to other groups of animals. Some of the parasitic planarians, like *Bdellura*, which lives in the gill books of the horse-shoe crab (*Limulus*), are so strikingly leech-like in form, including the sucker, that until comparatively recent times they were generally classified as leeches. Indeed this was true of parasitic members of many other groups, such as certain trematodes related to the liver flukes, nemertians, oligochaetes (earthworms), and polychaetes (marine bristle worms), all of which were at times classified as leeches. These resemblances are due to the operation of an evolutionary principle known as convergence, by virtue of which animals of quite diverse origins and not at all closely related but living a similar life in a similar environment often come to possess superficially similar forms and analagous structures. Such cases were much misunderstood in pre-evolutionary days and led to many errors of classification, which were corrected only with increasing knowledge of anatomy and the application of this principle. So in the course of time various planarians and other animals of similar form have been culled from the Hirudinea or leeches and placed in their proper groups, leaving the Hirudinea as we know it today compact and clearly circumscribed. But even with their limits thus determined the practical difficulty of distinguishting leeches and planarians remains, as is sufficiently evident in the experience of specialists on leeches, who very frequently have submitted to them as leeches not planarians only but examples of the other groups named. Since coming to Darjeeling I have repeatedly had this confusion between leeches and planarians brought to my attention. One of your most common planarians is terrestrial, nearly black, about four inches long, slender, with a broad crescentic head and it crawls about drains and other damp places, especially at night. It is known as the

hammer-headed leech and the belief is widespread that with the knife-edged head it makes an incision in the skin into which the head is then inserted and blood swallowed. Are any readers of the "Journal" acquainted with the origin of this strange belief? Then the little gray and brown planarians so common under stones in nearly all clear, cold streams in the Darjeeling District are often mistaken for the young of the cattle or horse leech. A close relative of the planarians (*Temnocephala*), commonly found living on freshwater or land crabs, which really resembles leeches more closely than either of the others, inasmuch as it is provided with a sucker, seems not to be generally known.

If one were to ask the man-in-the-street, or more appropriately in Darjeeling, the man in the tea garden to define leeches, he might be expected to formulate something like: pestiferous worms with suckers that bite and draw blood. Probably he would make no attempt to define planarians. The above definition might serve so far as it relates to the familiar land, cattle and elephant leeches, the only true leeches that are likely to fall within the experience of local tea planters. But as applied to leeches is general it lacks both of the primary attributes of a good definition. That is, it neither comprehends all known cases within its category nor does it exclude all that fall without it. There are many leeches that feed not on blood but on entire insect larvae, earthworms, slugs, the soft parts of snails, etc. and there are a few burrowing leeches that have lost the suckers more or less completely and have assumed the form of earthworms. On the other hand not a few animals belonging to other groups possess suckers and feed on blood or other animal juices. Owing to the gradation of animal forms and their arrangement in complex branching series which are the natural result of their evolution, it is commonly impossible to form brief and simple and at the same time accurate definitions of animal groups. True definitions may be framed in strictly teachnical language by the use of scientific terms and by referring small groups to more inclusive ones, all of which have been defined previously. Such a definition, however, would have little meaning for one not zoologically trained For the purpose of this article, therefore, no attempt to define either of the groups will be made but the method of comparative description will be employed.

What do leeches and planarians have in common? Well, necessarily both have the organs and tissues of animals of their grade of organization. They have digestive, circulatory, excretory, reproductive, nervous, locomotory, etc. systems, with the equipment of integumentary structures, sense organs, glands and protective devices necessary to maintain them in their particular environment. Both leeches and planarians have marine, freshwater and terrestrial representatives and both free-living and parasitic or semiparasitic forms, though the latter are especially frequent among leeches. There is some resemblance in form, both presenting slender, elongated types, either flat or cylindroid, broad, flat, leaf-like types and parasitic types with suckers. As both live under conditions of high moisture, both possess in the skin numerous mucous glands, the slimy secretion of which is protective. As strong light, or rather the heat and dryness associated with it, is detrimental to both, both are provided with so-called eyes, which are merely light-perceiving organs to guide them to the saving shade. Both are hermaphroditic and lay fertilized eggs in capsules, and in both the digestive tract very commonly begins with a muscular pharynx or proboscis and the gut is provided with branches that end blindly. Not infrequently leeches and planarians, especially the terrestrial species, present similar color patterns.

In spite of these resemblances the differences are many and profound. If the exterior of the two animals be examined under a lens, it will be perceived that the surface of a planarian appears smooth and almost uniform and featureless, while that of a leech presents a complex picture. Conspicuous are numerous furrows encircling the body and dividing it into rings from end to end. On certain of these rings or annuli repeated at regular intervals (typically on every fifth one in the blood-sucking leeches but varying from every second to fourteenth in other leeches) will be observed a transverse row of little whitish or translucent dots very regularly and symmetrically arranged in pairs, of which there are generally four on the upper and three on the lower surface. These spots are peculiar sense-organs called sensillae and their regular repetition, together with certain characteristics of the rings themselves, gives a clue to the most fundamental feature of the leech structure. For if the internal organs of a leech be examined it will be found that each system is made up of parts repeated in correspondence with the arrangement of the

sensillae. For each zone of sensillae there is a ganglion and nerve trunks of the nervous system, a block of muscles in the body wall, a central chamber and usually a pair of blind sacs of the digestive tract, a set of annular blood and lymph vessels of the circulatory system, a pair of nephridia or Kidney tubules of the excretory system, a pair, or their equivalent, of testes of the reproductive system, etc. In other words, the body of a leech is built up of a series of repeated and equivalent units, each containing a part of each of the principal organ systems, somewhat as a railroad train is made up of coaches coupled together. And it is interesting to note that in every species of leech that has been critically studied the number of these units has been found to be exactly thirty-four. These units of structure are known as segments or metameres and animals so organized are described as segmented or metameric.

Nothing of this kind is found in the planarians. There is no repetition of organ units; no important repetition of parts. The entire body is organized on the one unit plan. It is like a motor bus rather than a train. It is true that a few planarians exhibit an incipient segmentation, but this affects imperfectly a few organs only and at most is only pseudo-metamerism. It is true also that many of the smaller Turbellaria related to the planarians form chains of individuals by a process of serial budding but these soon become free and swim off as independent animals. This is not metamerism but corm-formation, a method of asexual reproduction. Many truly metameric animals, such as certain marine annelids, possess this power to a high degree, along with their segmental structure.

The differences just enumerated, along with others too technical to be mentioned here, have led zoologists to classify the planarians and leeches in widely separated branches or phyla of the animal kingdom, the former in the Platyhelminthes, along with such animals as liver flukes and tapeworms, and the latter in the Annelida, with earthworms, marine bristle worms and some others less familiar. This classification, however, is of comparatively recent date. Down to the middle of the last century, and in some textbooks of zoology even to the last quarter, leeches were generally placed among the Platyhelminthes, notwithstanding that the great French zoologist and pioneer evolutionist, Lamarck, had correctly perceived their relationship as early as 1802. The reason why the error persisted so long is evident enough. Not

only do leeches resemble closely the external form and mode of life of those trematodes or flukes that live as external parasites of fishes but the most studied blood-sucking leeches have departed widely from typical annelidan structure and correspondingly approached the flat worms in one important respect. One of the characteristics of the latter is that instead of having a body cavity or peritoneal space between the body wall and the viscera, as we ourselves have along with most higher animals, this space is filled nearly solidly with various tissues. Now, many of the leeches present a similar condition, the body appearing to be solid and the body cavity absent But even here later studies have shown that remnants of a segmented body cavity still persist in the so-called sinus system of lymph vessels.

Besides the structural distinctions there are some differences in habits and behavior. The mode of locomotion is very different. Leeches employ the very familiar looping progression, which requires adhesive organs at both ends of the body and a powerful and somewhat complex muscular system. Planarians move forward with a slow gliding, somewhat sinuous, movement with the entire lower surface of the body in contact with the substratum. This is accomplished by myriads of cilia or minute, hair-like processes, which cover the surface of the body thickly and which beat from before backward in such manner that by their combined action the body is carried forward on the bed of mucous secreted by the skin glands as the animal slips along. Waves of muscular contraction assist somewhat and especially cause the slight bendings to right and left, or the more definite turnings when a diverting sensation is received. As a rule planarians cannot lift the body free from the substratum, as do leeches, and their movements lack entirely the quickness of the latter. Nor do they swim, as do aquatic leeches, though they have the remarkable habit of crawling back down along the surface of quiet water, using the surface film for attachment as though it were a firm substratum.

The feeding habits of leeches and planarians also differ. Those of the local species of the former are too well known to require description. Planarians are largly scavengers but they will also attack, kill and devour, sometimes several of them in co-operation, earthworms and other small and weak animals. Unlike leeches, in which the mouth is in the head, planarians have theirs far back near the middle of the body on

the under side. The planarian "head" is chiefly a place for holding and utilizing sense organs. Feeding is accomplished by means of a long tubular, muscular proboscis, which is protruded from the mouth and, like a hydraulic dredge, sucks up the soft parts of the dead body and deposits them in a usually much branched gut.

Another interesting difference is in the capacity for separation after injury. Leeches have such a finished and determinate organization that like ourselves their powers of regeneration are extremely limited. Although they are tough and hard to kill and can heal wounds with scar tissue, they cannot replace lost parts. Planarians, on the contrary, with their generalized and comparatively simple organization, possess almost unlimited powers of regeneration. Not only do they grow new parts to replace lost ones but if cut into pieces each will grow a complete new worm if given time and care, and some of them normally multiply by detaching portions of the body automatically.

The planarians of Darjeeling that are most frequently confused with leeches are the terrestrial forms, of which there are several genera and species, the so-called hammer-headed leech being the most familiar. These are all long, slender, slimy creatures not at all leech-like in appearance or behavior, though sometimes found in the same places or even actually together. It is interesting to note that often they and the leeches have similar color patterns. One is characterized by conspicuous black and yellow stripes like the "stinging" leech, another is nearly black like the common grass leech, and a third is grey with darker stripes like the bush-climbing leech. When this color similarity was first brought to my attention by specimens sent along with leeches, I thought that this might be a case of mimetic resemblance such as has been described especially among butterflies and other insects. Since coming to India I have paid some attention to this point and can find no evidence that the similarity can possibly be protective to either. The two animals are otherwise so different in appearance and manners that no animal, save only *Homo sapiens*, could possibly be so stupid and inobservant as to mistake one for the other.

The aquatic planarians of Darjeeling are all small and inconspicuous but may be found quite commonly clinging close to the under surface of stones in many small streams. Many of them prefer cold water and one species has been found clear up to the foot of the

snows. In general appearance they resemble small aquatic leeches but may be distinguished easily by their mode of progression.

Much more leech-like in appearance than either of the above are the Lemnocephali, near relatives of the planarians which live on the fresh water crabs. They possess a large posterior sucker but are at once distinguishable from leeches by the corona-like arch of radiating processes that crowns the head.

In comparing these two groups of animals we find an illustration of one of the problems that ever faces the student of living things. All animals and plants are subject at all times and in all their parts to two sets of molding influences. On the one hand are the so-called hereditary or genetic influences which are deep-seated in the very substance and organization of the germ-cells, as which the individual animal or plant begins life. On the other are the many and complex factors of the environment or surroundings among which the animal or plant lives. Whenever a striking resemblance between two organisms is observed it becomes the problem of the naturalist to determine how far these two sets of influences are operative, and on the correctness of his decision depends the integrity of our classifications and the soundness of our biological philosophy As has been seen the resemblance between leeches and planarians is to be interpreted not as genetic but primarily as due to certain similarities in environment and mode of life. Nowhere in the world may one find more numerous or more striking examples of these convergences than in the teeming fauna and flora of India.

A Fluke Double Shot—Python and Otter

In the correspondence columns of the "Field" one often meets with a sportsman's account of some curious freak "Double" when, in addition to the intended victim, some luckless creature, lurking unnoticed in the background, is unwittingly laid low by a stray pellet or spent bullet. Most of us who "swing a gun" can recall one or two such instances from our own shooting experiences, and many and strange are the victims of recorded cases of these fluke "doubles". Nevertheless I do not remember having heard of a case in any way resembling the one that fell to my lot during last cold weather.

This is what happened.

Early one morning last January we were out "ghooming" in the South Borajhar Forest, working from the Nilpara road towards the grass jungle that lies in the west. As our elephant came down to cross the Malangi River I caught sight of something swimming in the water which I took to be an otter. A small head was bobbing up and down on the edge of a patch of water-logged "Kasila" grass, about 30 yards away under the bank. Now our Darjeeling Museum is in need of good otter skins, so I promptly changed my rifle for the 12 bore and gave the bobbing head a charge of No. 4 shot from the choke barrel. A great swirling and splashing among the "Kasila" was a sure sign that the shot had gone home, so over we went to investigate.

At first we could see nothing in the shallow muddy water, but a low "sh-h-h-h-h" from the thicket of the "Kasila" grass reassured us. We searched in the direction of the sound, and there we found, not an otter, but a very angry python half submerged at the water's edge. A large stick soon finished off the python, which was found to have one or two shot wounds on the upper part of its body. The mahout laughed and declared that he had known from the beginning that our quarry was a swimming snake and not an otter. I was sorely puzzled and reluctantly admitted that it must have been the python's head that I had seen and fired at—though I still had my secret doubts.

The snake, which was over 9 feet long, could not be carried on the elephant, so it was firmly tied, with strong creepers to a thick branch and left beside the river. The elephant obligingly flattened down a few nearby trees for the purpose of land-marks, and later a couple of coolies were sent to bring the snake in.

At tiffin time the coolies returned, bringing with them not only the stunned snake, but also the stiff body of a freshly killed otter. Before starting back they had taken the python down to the river to wash it, and there among the "Kasila" roots they had spotted the dead otter. They did not know how it had died, but as the body was fresh they brought it along to the Sahib.

How I cursed that mahout for having laughed at me! Of course I *knew* that it was an otter I had shot at, but then one is apt to doubt one's own eyes when indisputable evidence, like that wounded snake, is brought forward to confound one. Yes! there were

the shot marks on the otter's head. My python was but the second victim of a super fluke "double" shot.

The otter was a full grown female of the small species which live in our jungle streams: the soft-toed otter. The skin and skull duly found their way to the Darjeeling Museum.

T. V. D.

Manipur Deer

I regret I have no records of measurements with me, but I got one of 52″ measured along the curve from the *tip of the Brow antler to end of Royal*. I have seen a 57″ head measured the same way.

With regard to the Editor's remark "Perhaps the 52″ and 57″ should read 32″ and 37″", my measurements are correct. In the head whose measurements are given as 39″ by Rowland Ward this measurement is from the base of the Royal to the tip of same; adding 13″ for the Brow time makes the whole curve 52″ as given in my article. I do not know the relative measurements of the Brow and Royal of the 57″ head.

Wildbad,
Black Forest,
Germany,
26th June 1932.

H. S. Wood,
Colonel, I.M.S.

A male *Hypolimnas misippus* L., courting a male *Danais chrysippus* L.

In the *Proceedings of the Entomological Society of London, Vol. VII, Part I, p. 20, 1932*, there is the following interesting note:—

"Prof. Poulton exhibited a male *chrysippus* kindly sent to him, 2 February 1932, by his friend Prof. T. Bainbrigge Fletcher. The following note accompanied the specimen:—

'Danais (*Limnas*) *chrysippus* pursued persistently by *Hypolimnas misippus*: ♂, not attacking but courting; Coimbatore; 24 Jan. 1913. This specimen was put away in an open envelope in a cardboard box, which was by no means proof against mites and *Lepisma*. That it has not been eaten, after lying about for nineteen years says something for its unpalatability.'

The condition of the specimen provided a striking confirmation of the observations recorded and referred to in 1930, *Proc. Ent. Soc. Lond.*, 5: 41—all the more striking because the liability to attack by pests would have been so great in the tropics. The fact that a male was being courted was a proof that colour and pattern and no other qualities were the stimulus which acted on the pursuing *Hypolimnas*. The sexes of *chrysippus* being alike and equally providing a model for the female *misippus*, it was evident that they would equally attract the male of the latter so far as its epigamic behaviour is determined by the sense of sight".

It seems rather extraordinary that a butterfly should mistake another butterfly, however much it resembled its own female, for a female of its own kind. The two butterflies belong to totally different families, the *Hypolimnas* being a Nymphalid and the *Danais* a Danaid; both are very common plains species.

The reference to the *Proc. Ent. Soc. Lond.* 1930 refers to a note confirming the observation that distasteful butterflies are not eaten by insect pests. The bodies of the *Danaidæ* are leathery and presumably unwholesome and these butterflies have warning colouration which is associated with unpleasant taste. We have seen this *Danais* attacked and killed by birds but not eaten; presumably once a bird has discovered the butterfly to be unpalatable, it no longer pursues it.

Editor.

List of the Butterflies found in our area

By

C. M. Inglis, F. Z. S., F. E. S., E. M. B. O. U.

(*Continued from page 35.*)

Family VII Erycinidæ

360 *Libythea lepita lepita* M.
The Common Beak.
*361 *Libythea myrrha sanguinalis* Fruh.
The Club Beak.
*362 *Zemeros flegyas indicus* Fruh.
The Punchinello.
363 *Dodona durga* Koll.
The Common Punch.
*364 *Dodona dipæa dipæa* Hew.
The Lesser Punch.
*365 *Dodona eugenes venox* Fruh.
The Tailed Punch.
*366 *Dodona egeon* Db.
The Orange Punch.
*367 *Dodona ouida ouida* M.
The Mixed Punch.
*368 *Dodona adonira adonira* Hew.
The Striped Punch.
*369 *Abisara fylla* Db.
The Dark Judy.
*370 *Abisara neophron neophronides* Fruh.
The Tailed Judy.
*371 *Abisara chela chela* De N.
The Spot Judy.
*372 *Abisara echerus suffusa* M.
The Plum Judy.
*373 *Stiboges nymphidia* But.
The Columbine.

Family VIII Lycænidæ.

Subfamily Poritinæ.

*374 *Poritia hewitsoni hewitsoni* M.
The Common Gem.

Subfamily Gerydinæ

*375 *Gerydus boisduvali assamensis* Doh.
The Common Brownie.
376 *Allotinus drumila* M.
The Crenulate Darkie.
†377 *Allotinus multistrigatus multistrigatus* De N.
The Great Darkie.

Subfamily Lycæninæ.

*378 *Taraka hamada mendesia* Fruh.
The Forest Pierrot.
*379 *Spalgis epius epius* Wd.
The Apefly.
*380 *Pithecops hylax* F.
The Forest Quaker.
*381 *Neopithecops zalmora* But.
The Quaker.
*382 *Megisba malaya sikkima* M.
The Malayan.
*383 *Castalius rosimon rosimon* F.
The Common Pierrot
*384 *Castalius caleta decidia* Hew.
The Angled Pierrot.
*385 *Castalius elna noliteia.* Fruh.
The Elbowed Pierrot.
*386 *Tarucus ananda* De N.
The Dark Blue Pierrot.
*387 *Tarucus theophrastus nara* Koll.
The Rusty Pierrot.
388 *Euchrysops cnejus* F.
The Gram Blue.
*389 *Euchrysops pandava pandava* Hors.
The Plains Cupid.
390 *Everes argiades hellotia* Men.
The Tailed Cupid.
391 *Everes dipora* M.
The Dusky Blue Cupid.
*392 *Lycænopsis albocærulea* M.
The Albocærulean.
*393 *Lycænopsis transpecta* M.
The White-banded Hedge-Blue.
*394 *Lycænopsis marginata* De N.
The Margined Hedge-Blue.
*395 *Lycænopsis puspa grisea* Fruh.
The Common Hedge-Blue.

*396 *Lycaenopsis limbata placida* M.
The Plain Hedge-Blue.
*397 *Lycœnopsis cardia dilecta* M.
The Pale Hedge-Blue.
††398 *Lycœnopsis huegellii oreana* Swin.
The Large Hedge-Blue.
399 *Lycœnopsis huegellii oreoides* Evans.
*400 *Lycœnopsis argiolus jynteana* DeN.
The Hill Hedge-Blue.
401 *Chilades laius laius* Cr.
The Lime Blue.
402 *Zizera trochilus putli* Koll.
The Grass Jewel.
*403 *Zizera maha maha* Koll.
The Pale Grass-Blue.
*404 *Zizera lysimon* Hub.
The Dark Grass-Blue.
*405 *Zizera gaika* F.
The Tiny Grass-Blue.
*406 *Zizera otis otis* F.
The Lesser Grass-Blue.
407 *Lycœna semiargus annulata* Elwes.
The Dull Chumbi Blue.
†408 *Lycœna younghusbandi* El.
The Chumbi Green Underwing.
*409 *Lycœna pheretes pharis* Faw.
The Mountain Blue.
*410 *Lycœna asiatca* Elwes.
The Sikkim Mountain Blue.
††411 *Polyommatus eros arene* Fawcett.
The Common Meadow Blue.
*412 *Orthomiella pontis pontis* Elwes.
The Straightwing Blue.
413 *Syntarucus plinius* F.
The Zebra Blue.
*414 *Catachrysops strabo* F.
The Forget-me-not.
†415 *Catachrysops lithargyria* M.
The Silver Forget-me-not.
*416 *Lampides bœticus* Ramb.
The Pea Blue.
*417 *Nacaduba pactolus continentalis* Fruh.
The Continental 4 Line Blue.
418 *Nacaduba hermus nabo* Fruh.
The Pale 4 Line Blue.

*419 *Nacaduba vajuva* Fruh.
The Violet 4 Line Blue.
420 *Nacaduba viola merguiana* M.
The Mergui Pointed Line Blue.
*421 *Nacaduba atrata euplea* Fruh.
The Transparent 6 Line Blue.
422 *Nacaduba akaba gythion* Fruh.
The Opaque 6 Line Blue.
*423 *Nacaduba aluta cœlestis* De N.
The Banded Line Blue.
†424 *Nacaduba bhutea* De N.
The Bhutia Line Blue.
*425 *Nacaduba nora* Fd.
The Common Line Blue.
*426 *Nacaduba dubiosa sivoka* Evans.
The Sivoke Tailers Line Blue.
*427 *Nacaduba dana* De N.
The Dingy Line Blue.
*428 *Jamides bochus bochus* Cr.
The Dark Cerulean.
*429 *Jamides celeno celeno* Cr.
The Common Cerulean.
*430 *Jamides elpis eurysaces* Fruh.
The Metallic Cerulean.
*431 *Jamides kankena pseudelpis* But.
The Glistening Cerulean.
432 *Azanus ubaldus* Cr.
The Bright Babul Blue.
433 *Azanus uranus* But.
The Dull Babul Blue.
*434 *Lycœnesthes emolus emolus* God.
The Ciliate Blue.
†435 *Lycœnesthes lycœnina lycambes* Hew.
The Pointed Ciliate Blue.
*436 *Niphanda cymbia cymbia* De N.
The Pointed Pierrot.
437 *Heodes phlœas flavens* Frd.
The Common Copper.
*438 *Heliophorus epicles indicus* Fruh.
The Purple Sapphire.
*439 *Heliophorus moorei moorei* Hew.
The Azure Sapphire.
*440 *Heliophorus tamu tamu* Koll.
The Powdery Green Sapphire.
*441 *Heliophorus brahma* M.
The Golden Sapphire.

442 *Listeria dudgeoni* De N.
Lister's Hairstreak.
443 *Thecla bieti irma* Evans.
Mrs. Bailey's Purple Hairstreak.
444 *Thecla pavo* De N.
The Peacock Hairstreak.
*445 *Thecla duma duma* Hew.
The Metallic Green Hairstreak.
446 *Thecla zoa* De N.
The Powdered Green Hairstreak.
*447 *Thecla syla assamica* Tyt.
The Assam Silver Hairstreak.
*448 *Curetis bulis bulis* Db.
The Bright Sunbeam.
*449 *Curetis acuta dentata* M.
The Angled Sunbeam.
*450 *Iraota timoleon timoleon* Stoll.
The Silver streak Blue.
451 *Horsfieldia anita anita* Hew.
The Purple Leaf Blue.
†452 *Amblypodia camdeo camdeo* M.
The Lilac Oak Blue.
†453 *Amblypodia silhetensis silhetensis* Hew.
The Sylhet Oak Blue.
*454 *Amblypodia ænea* Hew.
Hewitson's Dull Oak Blue.
455 *Amblypodia khamti* Doh.
Doherty's Dull Oak Blue.
*456 *Amblypodia hewitsoni* D. D.
The Indian Oak Blue.
*457 *Amblypodia centaurus pirithous* M.
The Centaur Oak Blue.
458 *Amblypodia singla* De N.
The Yellow disc Oak Blue.
*459 *Amblypodia bazalus* Hew.
The Powdered Oak Blue.
*460 *Amblypodia eumolphus eumolphus* Cr.
The Green Oak Blue.
*461 *Amblypodia rama rama* Koll.
The Dark Himalayan Oak Blue.
*462 *Amblypodia paramuta* De N.
The Hooked Oak Blue.
*463 *Amblypodia perimuta perimuta* M.
The Yellow disc Tailless Oak Blue.
*464 *Amblypodia paraganesa paraganesa* De N.
The Dusky Bush Blue.

*465 *Amblypodia abscus indicus* Riley.
The Aberrant Bush Blue.
466 *Amblypodia diardi* Hew.
The Bifid Plush Blue.
*467 *Amblypodia fulgida* Hew.
The Shining Plush Blue.
*468 *Amblypodia adriana* De N.
The Variegated Plush Blue.
469 *Amblypodia asoka* De N.
The Spangled Plush Blue.
*470 *Amblypodia chinensis* Fd.
The Chinese Plush Blue.
*471 *Amblypodia areste areste* Hew.
The Tailless Plush Blue.
†472 *Amblypodia fulla ignara* Riley.
The Spotless Oak Blue
*473 *Surendra quercetorum quercetorum* M.
The Common Acacia Blue.
474 *Surendra todara distorta* De N.
The Silver-streaked Acacia Blue.
475 *Mota massyla* Hew.
The Saffron.
*476 *Loxura atymnus atymnus* Cr.
The Yam fly.
*477 *Yasoda tripunctata* Hew.
The Branded Yam fly.
478 *Spindasis vulcanus vulcanus* F.
The Common Silverline.
479 *Spindasis ictis ictis* Hew.
The Common Silverline.
*480 *Spindasis nipalicus sani* De N.
The Silver grey Silver line.
481 *Spindasis rukmini* De N.
The Khaki Silver line.
482 *Spindasis elwesi* Riley.
Elwes' Silver line.
*483 *Spindasis syama peguanus* M.
The Club Silver line.
*484 *Spindasis lohita himalayanus* M.
The Long banded Silver line.
*485 *Pratapa cotys* Hew.
The White-banded Royal.
*486 *Pratapa ctesia* Hew.
The Bi-spot Royal.
487 *Pratapa blanka argentea* Aur.
The Silver Royal

*488 *Pratapa deva lila* M.
The White Royal.
489 *Pratapa icetas extensa* Evans.
The Dark Blue Royal.
490 *Pratapa cleobis* God.
The Broad tail Royal.
*491 *Maneca bhotia* M.
The Slate Royal.
*492 *Tajuria jangala ravata* M.
The Chocolate Royal.
493 *Tajuria yajna istroidea* De N.
The Chestnut and Black Royal.
494 *Tajuria melastigma* De N.
The Branded Royal.
†495 *Tajuria diaeus* Hew.
The Straight line Royal.
496 *Tajuria albiplaga* De N.
The Pallid Royal.
497 *Tajuria jehana* M.
The Plain Blue Royal.
498 *Tajuria cippus cippus* F.
The Peacock Royal.
499 *Tajuria illurgis* Hew.
The White Royal.
500 *Tajuria illurgioides* De N.
The Scarce White Royal.
*501 *Tajuria maculata* Hew.
The Spotted Royal.
502 *Tajuria jalindra indra* M.
The Banded Royal.
503 *Charana mandarinus* Hew.
The Mandarin Blue.
504 *Neocheritra fabronia* Hew.
The Pale Grand Imperial.
†505 *Cheritrella truncipennis* De N.
The Truncate Imperial.
*506 *Cheritra freja freja* F.
The Common Imperial.
*507 *Zicherra acte* M.
The Blue Imperial.
508 *Biduanda melissa cyara* Hew.
The Blue Posy.
*509 *Horaga onyx onyx* M.
The Common Onyx.
*510 *Catapœcilma elegans major* Fruh.
The Common Tinsel.

511 *Catapœcilma delicatum* De. N.
The Dark Tinsel.
*512 *Chliaria othona* Hew.
The Orchid Tit.
*513 *Chliaria kina cachara* M.
The Blue Tit.
*514 *Hypolycœna erylus himavantus* Fruh.
The Common Tit.
*515 *Zeltus etolus* F.
The Fluffy Tit.
516 *Artipe eryx* L.
The Green Flash.
*517 *Deudoryx epijarbus amatius* Fruh.
The Cornelian.
variety *diara* Swin.
The Rare Cornelian.
518 *Virachola isocrates* F.
The Common Guava Blue.
†519 *Virachola perse perse* Hew.
The Large Guava Blue.
520 *Rapala tara* De N.
The Assam Flash.
*521 *Rapala varuna orseis* Hew.
The Indigo Flash.
*522 *Rapala schistacea* M.
The Slate Flash.
†523 *Rapala scintilla* De N.
The Scarce Slate Flash.
*524 *Rapala pheretimus pelosiris* Hew.
The Copper Flash.
525 *Rapala melampus* Cr.
The Indian Red Flash.
526 *Rapala jarbas* F.
The Common Red Flash.
527 *Rapala buxaria* De N.
The Shot Flash.
*528 *Rapala nissa nissa* Koll.
The Common Flash.
*529 *Rapala nissa rectivitta* M.
The Common Flash.
† Variety *rosacea* De N.
†530 *Sinthusa virgo* El.
The Pale Spark.
*531 *Sinthusa chandrana grotei* M.
The Broad Spark.

532 *Sinthusa nasaka amba* Kirby.
The Narrow Spark.
533 *Bindahara phocides phocides* F.
The Plane.
534 *Araotes lapithis* M.
The Witch.
535 *Liphyra brassolis* Wd.
The Moth Butterfly.

(To be continued)

Mushrooms in Bengal.

In the article on "Mushrooms" in the Encyclopaedia Britannica it is stated that the edible mushroom (Agaricus Campestris) is found in all the temperate regions of the world. If this is meant to imply that Mushrooms are not found in any of the tropical or sub-tropical regions, the writer of the article is mistaken. Agaricus Campestris grows wild in many parts of Bengal; this is recognised by Mr. Percy Lancaster in his useful book "The Amateur in an Indian garden".

In Dacca, and in western Bengal including Calcutta, the season for Mushrooms is roughly speaking the period of thunderstorms, beginning in April or May according to the place and season, and ending when the monsoon rains have started in earnest. After each successive downpour a crop of Mushrooms springs up and the season ends in June or July, when the ground is throughly soaked.

In Jalpaiguri and Rangpur, on the other hand, when the rainfall is very heavy the Mushroom season starts about January, when the ground is drying up. If conditions are favourable, *i. e.* if there are showers from time to time Mushrooms may go on appearing throughout February and March and through the period of thunderstorms till the end of May, when the soil is saturated—at least this is what I observed in 1931. In 1932 Mushrooms duly started sprouting in January but there was almost no rain in the first 3½ months of the year and no Mushrooms from about the end of February till the middle of April, when showers brought them up again. The rainfall being scantier this year, the Mushroom season in Jalpaiguri lasted till after the middle of June.

From the foregoing it appears that Mushrooms like a certain amount of moisture in the soil but will not grow when it is really dry or well saturated.

They seem to prefer relatively high ground which does not go under water in the rains but to be indifferent to the nature of the soil—sprouting as readily from the red clay of the Ramna Maidan at Dacca or the laterite of Khargpur as from the sandy loam of Northern Bengal.

The limits of air temperature within which they will grow are also wide. I have found Mushrooms 1,000 feet above sea-level in Invernessshire amid the rigours of a Scottish summer and at Asansol after a period of heat when the thermometer had reached 116°. There appears to be no reason why Mushrooms should not grow wild in the Darjeeling Hills but they do not seem to do so to any great extent. On this point residents in the district should be better informed than I am, but in the course of many walks and rides in the hills extending over several years I only remember finding Mushrooms thrice—at Kalimpong in April, on the Victoria Road below Darjeeling in May and on Sum Tea Estate, at 4000 to 4500 ft. above sea level, in June.

J. G. Drummond

An Appeal

Will some Fisherman with experience in Assam kindly contribute a short chapter, dealing with this sport in that Province, for a book. It will be duly acknowledged.

The following heads are suggested:—

(1) Rivers with the best baits, size of fish and varieties
(2) Seasons.
(3) Tackle recommended.
(4) Best way of capture.
(5) Good bags.
(6) General information, shooting, etc.
Healthiness of rivers, Transport, etc.

No mention of pet localities, etc. need be made.

The undermentioned would be most grateful for this information.

A. S. J. MacDonald,
Ryam Factory & P. O.,
Darbhanga Dist.
Behar.

ZOOLOGICAL GARDEN
CALCUTTA

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Game Birds of Sikkim, including the Darjeeling District, and of the Jalpaiguri District, Bengal.

By

C. M. Inglis, F. Z. S., F. E. S., E. M. B. O. U.

(Continued from page 44.)

We now come to the sub-family *Perdicinæ*, which is represented in India by twenty genera, of which only ten occur in our area. The first of these is *Tragopan*, containing five Indian species and sub-species, only one of which is found with us. All the cocks of the Horned Pheasants or Tragopans have two brilliant fleshy horns and a bib-like wattle on the throat; the horns, as a rule, lie hid in the feathers and the wattle is rather shrivelled up, but during the breeding season both are very prominent, the bib expanding greatly: the colours of both are intensely brilliant.

32. The Crimson Horned Pheasant or Tragopan

Tragopan satyra (Linn.)

The cock is a gorgeous bird. Finn's concise description is sufficient:—"In this species the male's face and throat are thinly feathered; the general plumage is rich red on the neck and below, and mottled black and brown above, sprinkled nearly all over with round white spots edged with black; the head and tail are black, with a red band round the back of the former; the bend of the wing is also red, and there are red patches on the mottled brown plumage of the rest of the wing and the rump".

Beebe writes:—"Mandibles black, horn-coloured towards the tips; irides dark hazel-brown; legs and toes pale fleshy, becoming dull crimson at the breeding season and paling to a fleshy grey during the autumn and winter; claws brownish horn; the chin, upper throat and orbital area (even on the densely feathered portion) purplish blue. The gular wattle or lappet varies from a mere wrinkle to a length of 90 or 100 mm. during the breeding season. It is orange or salmon with transverse blue bars extending laterally inward from the margins. When retracted the blue predominates, the lighter colours being hidden in the wrinkles. The fleshy horns, invisible except during the periods of courtship, are brilliantly blue. Out of season they are about 25 mm. in length, lying inconspicuously among the crown feathers; when erected they may reach a length of 70 or 80 mm."

We noted the colour of the soft parts of a fine cock as follows:—

Bill horny brown, paler at tip; iris deep brown; gular apron purple down centre with some fingers of glistening greenish-blue, remainder light Indian red; lores purple, with black hairs; legs fleshy-red; claws brown.

The cock measures up to 28.5 inches with a tail up to 11.5 inches. The weight is from 3 lbs. 8 ozs. up to 4 lbs. 10 ozs.

Young cocks resemble the hens but are not so dark. "In a large series of young birds.....the individuals are about evenly divided between those which have acquired the strictly conventional first dress of their mothers, and those which are anteriorly precocious, showing a parti-coloured garb.....Occasionally upon typically first winter breast plumage we may find several scattered crimson feathers with the pearl-grey spot of the adult..."(*Beebe*).

The hen is:—"Above blackish mottled with buff, pale rufous and sandy; below lighter, a central whitish area on the feathers predominating over the buff and blackish mottling; tail irregularly barred with rufous and black". (*Beebe*). It is, as Hume so truly says, "a perfect poem without words" in the richness and depth of the tints.

The bill is horny; iris brown; legs and feet grey.

The length of the hen is up to 23¾ inches with a tail up to 10 inches. Weight 2 lbs. 4 ozs. up to 2 lbs. 10 ozs.

The chick in down has the "crown and nape rich chestnut, changing to chestnut brown on the back, rump and tail-tuft; lores an indistinct superciliium and sides of head and nape fulvous, the latter mottled with chestnut; forehead more orange-rufous; below pale fulvous or yellow-buff, greyer and duller on the abdomen" (*Stuart Baker*).

The distribution of this Pheasant, according to Stuart Baker, is:—"Garhwal, East through Nepal, Sikkim to Assam, North of the Brahmapootra as far East as Darrang.....roughly the upper waters of the Ganges may be taken as the dividing line between these two species". The other species mentioned is the Western Tragopan (*Tragopan melanocephalus*). Within our area Stevens says: "occurs on the outer ranges and in the interior of Sikkim at altitudes from *7000' to 9000', March and April*, and probably as low as *6,000' in the interior during the winter* and ascends to *12,000' in the summer*. A large number of specimens collected have enabled me to fix its breeding habitat at much lower limits than *L. impejanus*. It is very restricted in its zonal distribution but widely spread wherever it has the necessary dense cover.....Its call resembles 'wak' repeated several times in a loud pitched tone.....Breeding commences on the outer ranges in late March or early April. An oviduct egg has been extracted as early as the 5th of April....."

We got it at Phalut on the Singalila Range and also found it on the hills between Changu and the Natu La in September. Bailey wrote me:—"I got one on 24th March close to Gangtok about 8000 feet. I have never seen them lower. My 3 eggs laid in captivity were on 2nd, 3rd and 5th of May this year" (1926). Ludlow didn't find this bird common in the Chumbi Valley, Tibet. Meinertzhagen found them not uncommon at Lachung in December at elevations between 8,750 and 9,200 feet.

These handsome birds are rather solitary in habits but pairs may be come across and after the chicks are hatched these may be seen with the parent birds. They require dense cover. Our Phalut bird was in dense ringal bamboos, practically impenetrable. They appear to be very localized birds, remaining on the same ridge for years. Beebe writes:—"I have never observed the Tragopans on any ridge or slope where the adjacent valleys were dry, and when one hears or sees them far up the mountain side a tumbling little rivulet is almost certain to be found in the nearest gully..... In Sikkim and Eastern Nepal, where in spring I have studied Satyr Tragopans, I found that narrow side gorges, etched out of the slopes by tiny uncharted streamlets, were the best places for finding the birds". He considered that they always roosted "far down the valley" but this is apparently unusual.

Beebe goes on to say:—"As in the case of other birds inhabiting lofty regions, Tragopans work gradually

downwards at the approach of the cold and snow of winter.....At this season of the year the birds are silent unless the hen still communicates with her nearly grown young by means of the same low, clucking call which is used when they are chicks. Only when in dire fright or distress, as when suddenly flushed by a dog, do the birds—both cocks and hens—give utterance to a series of loud, raucous notes: *quak! quak! quak! quak! quak!*.....When the birds perceive approaching danger some distance off, they utter no sound whatever, but silently slip away..... The call note of the Satyr Tragopan is very distinct from its cry of alarm. I have heard it a number of times given by wild birds, and in captivity it is a very characteristic utterance. It differs in the two sexes. The male utters it as a herald of his nuptial display—a high, rather quavering báá! báá! báá! báá! Where this is heard the hen is usually near by, and unless something occurs to alarm the birds, a display is almost sure to follow. The hen utters a call comparable to this when separated from her nearly grown young, the call in this instance being given singly and in a slightly higher, shriller tone.

"The challenge of the adult cock Satyr is a most remarkable sound.....It has a wonderful carrying power, and I have heard a bird call from the same point about every ten minutes for a full hour.....When heard fifty yards away its deep, half-booming, half-bleating character is very evident, a weird, full-throated cry.....At this distance one can fit no written words to it, but further away, when more softened, it may be indicated *wah! waah! oo-ah! oo-aaaaah!* the last tone sometimes drawn out into a heartrending crescendo wail.....Native hunters are adepts at answering the birds and thus luring them within gunshot."

Beebe quotes Barnby Smith's account of the display of this Pheasant: "The lateral display of a cock Tragopan in good plumage is interesting; that is, he presents one side of the head, body, and tail to the hen, and lowers one wing and raises the other until he almost looks like the mere skin of a bird stretched flat on a wall. This pose is constantly assumed during the breeding season (from February onwards), the cock taking up a position about a yard distant from the hen and repeatedly assuming a new position if she moves off.

This lateral display, however, is as nothing compared to the frontal display, which I usually notice some three or four times each season. In this case

the cock faces the hen (about two or three yards distant) and commences by crouching down slightly, ruffling his feathers and spreading his wings, which are slowly flapped on the ground. The head is nodded repeatedly with increasing speed and the brilliant light blue horns gradually become inflated and extend forward from the black feathers of the head, whilst the bib (or gular wattle), which is also blue with pink side stripes, is gradually let down to its full length. Whilst this is being done the shivering and the rustling of the feathers have increased to an alarming extent, the body of the bird has been lowered quite near the ground, the wings are extended sometimes almost to their full width, and the whole business is preceded and accompanied (particularly in the early stages) by a curious noise like the clacking of two bones together, but how this noise is made I have never found out, though I should much like to know. When the bib has been extended to full length for a few moments the bird gathers himself together, moves forward about a yard, draws himself up to his full height (and it is surprising how high he can reach), keeps the bib fully extended in front of the hen for one moment, and then, within half a minute, horns and bib have entirely vanished and the cock is strolling about pecking grass, as if nothing uuusual had happened.

I am afraid anything I can say will fail to give an adequate idea of the extraordinary aspect of the bird whilst the display is at its height—indeed, I think anyone coming suddenly upon the spectacle would scarcely believe they were looking at a bird, the spectacle is so demoniacal.

So much for the conduct of the cock; but I think, if carefully considered, the conduct of the hen is even more curious, or perhaps I should say more inexplicable, for she seems absolutely lacking in interest as to the display of the cock".

They are omnivorous feeders, but, if anything, they prefer vegetable food. Of the crops of three birds examind by Beebe, "two held many torn leaves and flowers of the sweet-scented paper laurel, and one of these had also eaten a number of insects—several small earwigs, black ants and a good-sized cockchafer, as well as a few spiders and a small white centipede. The third bird, curiously enough, had packed its crop with the bruised scarlet petals of rhododendron blossoms, mixed with a few laurel leaves. Those examined by Meinertzhagen had eaten leaves and ferns believed to be

Diplazium and *Polypodium*.'" We have seen them eat maize in Bailey's aviary. They both feed on the ground and, according to Beebe, in low trees and bushes.

With regard to the Tragopan's qualities as a sporting bird, Whymper wrote to Stuart Baker:—"From a sporting point of view, both species of Tragopan are disappointing; even dogs, accustomed to Hill Pheasants, often fail to make them show themselves, though, as the only places I ever saw them in were dense ringal jungles, generally on very steep and broken hillsides, this is perhaps not to be wondered at. However, one never-to-be-forgotten morning, the dogs put up a hen Tragopan that came overhead an easy shot, and, as I fired, I became aware of a bird like a gigantic robin red-breast shooting down on me, and with a hasty shot about ten feet in front of him I had bagged a right and left, cock and hen *Tragopan satyra*, the most gorgeous of game-birds."

Colonel Tickell wrote:—"In 1842, when I was at Darjeeling, the Crimson Tragopan was to be met with between Pacheem and the Sungphul Mountain, along the road from Kutshing to the Sanitarium; and a clever snap shot might bag one or two in the early part of the winter, during a foggy mizzly morning. It was necessary to proceed rapidly and noiselessly along the road, peeping warily down each water course that crosses the path and shoots into the valley below. These gullies are shut in with the dense jungle that clothes the sides of the hills; but here and there a rock stands out, leaving a small open space, and on this occasionally at such an hour, and if no one else had haply passed that way, a Pheasant might be seen standing proudly upright or snatching a hasty breakfast ere the growing day sent him to the valley below. If the birds were within shot (but, indeed, in such thick cover, to be within sight was to be within shot), the sportsman either there and then potted him, or, if in a more chivalrous mood, started him on the wing, and took him as he rose to clear the jungle. Sometimes the bird, especially if a hen, would, on catching sight of the sportsman, run into cover.

As beforesaid, a snap *pot* when the bird is first sighted on the ground, or a snap *shot* as he rises through the bushes, is the sportsman's only chance. When a fine cock-bird shoots into the air, his inexpressibly rich plumage in clear relief against the snowy white mist of the valley far below is a splendid sight indeed! The aim should be quick, and the

charge heavy—of No. 1 or 2—for if not killed at once, search for a wounded bird is almost always profitless toil; and if it be only winged, pursuit is as vain as if it were missed altogether. Alas! if missed, the unlucky wight sees the kaleidoscopic vision shoot like a ruby meteor down the dizzy depth below, across the misty valley to settle in the woods of some far distant hill *Ehen, nunquam revisura!*"

Its principal enemy is man. Masson naively wrote:—"I recollect when out in the hills late one evening putting up more than twenty Pheasants, and they all settled on the oak trees close by. After two or three shots, I had to give up, as it got dark. However, next morning I returned at daybreak and managed to secure seven, four being off one tree"!!! Many are snared by the hill people, who erect a low fence across the route the Tragopans take, with several openings in which are fixed yak hair nooses. Beebe was told by one Nepalese that a certain valley held four of these birds and that "two he had already caught and eaten, and the others he would soon have." The natural enemies, according to the same author, include eagles, leopards, foxes, and especially the jungle cat and the larger species of civets. He was told about a leopard being shot "which had just dropped a still warm, dead Tragopan."

With regard to the trapping of these birds in Sikkim, Meinertzhagen writes in the *Ibis, 1927, p. 632:*—

"A covey is located in thick bamboo forest. A low net, not more than 18 inches high, is then erected across their most likely path, the net extending to 100 yards or more. At intervals in the net are holes through which the birds can pass, but each hole has a horse-hair noose in it. The birds are then slowly driven towards the net, run up and down it to find a way through, and eventually one or two get caught in a noose. They never seem to hop over the net, which they might easily do."

Stuart Baker gives the breeding season "about the first week in May and lasts through June, while in the highest latitudes a few hard-set eggs may be found as late as the first week in July". They, however, breed earlier than this, as a wild captured bird laid an egg on the 5th April. In captivity Beebe gives the period "from mid April to late in June" and he knew of a single egg being laid in August. Incubation is said to take from twenty-four to twenty eight days. Very little is known about its breeding habits. Baker received

eggs from Macdonald from the Chumbi Valley, and the latter wrote to him:—"The eggs of this Pheasant, *Chamdang* in Tibetan, were taken in the rhododendron and oak forest in the Chumbi Valley, and were found in a nest which was built in a tree at about 20 feet from the ground, and quite hidden from view until the hen bird flew from it and so disclosed its position. The two eggs already had signs of chicks in them. The forest here is very thick, but stunted, and the ground much broken up by huge great rocks covered with moss and ferns and ground: trees and rocks seem ever to be wet and damp.

The nest was just a jumble of very old dead twigs and branches, mostly rotten; and very fragile; perhaps the bird did not build it, but found this old mass of sticks and turned it into a nest.

The other nest was the same, but empty and lower down in the tree the men could almost reach up to it.

The natives tell me that they only lay two eggs as a rule, never more than four, and certainly one only sees two chicks with the old birds."

Stuart Baker describes the eggs as "very rich deep rufous-red, almost like Peregrine Falcons' eggs. Other eggs laid in captivity and another pair from Garhwal are similar in every respect but colour, varying from a pale bright rufous-buff to a bright reddish-buff. And the eggs have minute freeklings of a darker colour but in most so microscopical as not to show unless very carefully examined. Twelve eggs average 60.6×42.9 mm."

According to Beebe, Jamrach, between 1864 and 1882, imported two thousand three hundred and forty-three Monal and Crimson Tragopans, about one third being the latter species. About fifty per cent. died *en route*. It is interesting to note that year by year the mortality in transportation was reduced until, in 1879, 100 per cent. lived. Beebe has some other interesting information about these birds in captivity. They were bred in captivity as long ago as 1863 but even today they have not become established. The average length of life in the London Zoo, according to Chalmers Mitchell, is only one year and seven months, and four years and ten months the maximum period. The largest period lived by this bird in the Calcutta Zoo is only eighteen months.

(*To be continued.*)



John Bale, Sons & Danielsson, Ltd. London.

ÆGITHALISCUS CONCINNA RUBRICAPILLUS.
The Red-headed Tit.

PARUS MAJOR NIPALENSIS.
The Grey Tit.

PARUS MONTICOLUS MONTICOLUS.
The Green-backed Tit.

½ Nat. size.

The Tits of our area.

By

C. M. Inglis, F. Z. S., F. E. S., E. M. B. O. U.

(*With a coloured plate*)

The Tits belong to the family *Paridae* and are, except *Melanochlora*, birds of small size with short conical bills; the nostrils are protected by bristles or feathers; the feet and legs are stout and the wing, except in *Melanochlora*, rounded and weak.

The family is divided into seven genera, all of which, except one (*Remiz*), are found in our area. The genus *Melanochlora* is an aberrant form of Tit, which used to be placed in the sub-family *Liotrichinae* of the Babblers. Unlike other Tits, the sexes differ in plumage, have a long pointed wing and the nostrils only partly concealed. They are much larger birds than the other Tits.

The Tits are interesting little birds, very active in their habits, climbing about the branches, sometimes clinging head downwards, in their search for insects. They are found in small parties, pairs or sometimes singly.

The seven genera may be distinguished as follows:—

A. Head not crested.

a. Tail slightly rounded.

a'. Outer tail-feathers falling short of the tip of the tail by the length of the hind-claw ..... PARUS.

b'. Outer tail-feathers falling short of the tip of the tail by the length of the hind-toe and claw..... ÆGITHALISCUS.

B. Head slightly crested.

b. Tail slightly forked, plumage above olive-green..... .....SYLVIPARUS.

C. Head fully crested.

c. Tail slightly rounded.

c'. Crest black; wing less than 3½ inches..... .....MACHLOLOPHUS.

d' Crest yellow; wing never less than 4 inches ....MELANOCHLORA.

d. Tail square or slightly forked..LOPHOPHANES.

The birds of the genus *Parus* have the feathers of the crown full but not crested and there is a broad black ventral band. We have two species which are easily recognized:—

a. Back bluish-grey, sides of breast greyish white .....The Nepal Grey Tit.
b. Back dark green, sides of breast deep yellow .....The Green-backed Tit.

---

1. The Nepal Grey Tit.

Parus major nipalensis Hodgson.

(In centre of coloured plate)

Field identification:—A bluish-grey-backed Tit with black head and white patch on the side of the face; greyish-white below, with a broad black band down the centre. Seen in trees singly or in pairs.

Description: Length about 5 inches; wing up to about 2⅓ inches. Head, neck, breast and a broad band down the centre of the abdomen black; cheeks, ear-coverts and a small patch on the nape white; upper plumage bluish-grey, with a white wing bar; tail black, edged with ashy-grey on the four central feathers; the outer feathers mostly white; side of breast and abdomen white, tinged with vanceous. Sexes alike.

Iris brown; bill black; legs plumbeous. Our birds are not quite typical of this race.

Distribution:—*In our area*—The Duars and foothills of the Darjeeling District, where it is found, at any rate, at Sukna (*500 ft.*)

Outside our area—Whistler and Kinnear give the distribution of this sub-species as "Lower Nepal, Bihar, Bengal, Duars and Assam" (*Journal Bombay Natural History Society, Vol. XXXV, p. 519*).

Habits, etc:—According to Whistler, the Grey Tits are "more properly to be considered a hill than a plains bird, and each race breeds throughout the more wooded ranges of its area from a height of about 3,500 feet to their summits, even to 9,000 and 10,000 feet when this is possible. But above 6,000 feet it is usually rather scarce. While not strictly migratory it wanders a good deal after the breeding season, and then is found commonly in plain areas contiguous to the ranges on which it breeds".

These remarks do not coincide with what one finds in our area. Here these Tits are truly plains birds and

apparently do not ascend the hills at all. Stevens' experience agrees with our own. He writes:—"Recorded for the Himalayas at all altitudes up to 9,000′ or more according to Oates. This distribution is entirely erroneous for the Sikkim Himalaya. I have failed to locate this Tit even at the lowest limits; it may have some status in the Tista Valley at elevations approaching the plains level; all efforts to prove this conjecture have been to the contrary, and so far it has only been obtained at the *foot of the hills in more or less open country* at 500′ by Mr. G E. Shaw. I suspect the heavily forested tract along the foot-hills demarcates its distribution more effectively than any appreciable rise in elevation is likely to affect any extension at dispersal." According to O'Donel, it is a common *resident* species in the Eastern Duars but apparently less common in the Western part of the District.

They are active little birds, continually on the move, clambering about the trees in search of insects. They are arboreal but do come down to the ground, too, in the search for food. They are amusing little birds to watch as they clamber about the branches, sometimes hanging head downwards and getting into all sorts of positions. They are often seen singly or in pairs but not always so, consorting in small parties or joining other parties of small birds, all busy hunting for food. They frequent the more open forests and come into gardens freely. Their note, which has been syllabalized as *tsee tsee tsee* is pleasant. Whistler remarks:—"With the spring and the approach of the breeding season, this is supplemented by a number of louder and clearer calls, of which the most familiar is *zwink zwink*." They are mainly insectivorous but also eat various seed and fruits and are rather omnivorous Their flight is feeble.

In the Duars they breed in March and April. A pair used to breed outside O'Donel's compound The nests are pads of hair, wool, moss, etc. placed in holes in trees, walls, or occasionally banks. Hume mentions two cases of nests built on branches; one, which he saw himself, was "strengthened exteriorly with moss". The eggs are from 4 to 6 in number. They are broad ovals, slightly pointed at one end, pinkish-white in colour with spots and specks of reddish-brown, pale purple often more profuse and forming a zone round the thicker end. They measure about .71 by .54 inches.

2. The Green-backed Tit.

Parus monticolus monticolus Vigors.

(*At bottom of coloured plate*).

Field identification:—The commonest large Tit in the hills, easily recognized by its black head, breast and broad black band down the centre of the abdomen; a white patch on each side of the head, and yellow sides to the breast and abdomen. Often seen in gardens.

Description:—Length about 5 inches: wing 2.7 inches. Head, breast and broad band down the centre of the breast black; cheeks, ear-coverts and a small patch on the nape white; back greenish-yellow; rump slaty; wings black, edged with blue and with two wing-bars; tail black edged with blue and tipped with white; the outermost feathers entirely white; sides of breast and abdomen deep yellow. Sexes alike.

Iris brown; bill black; legs plumbeous.

Our Sikkim bird has been named *Parus monticolus lepcharum* by Meinertzhagen (*Bull, B. O. C. Vol. XLVI. p. 97*) on account of its darker green back and brighter yellow underparts but some naturalists do not consider this a good sub-species.

Distribution:—In our area.—Found all over the hills up to about *9,000 ft.* and in the Duars sparingly found in the cold weather at *500 ft.* but commonly seen at Buxa (*2,000 ft*). Stevens came across a small party at Bhutan Ghat (*600 ft*).

Outside our area—"The Himalayas from the extreme N. W. to Manipur, Chittagong and the N. E. of the Chin Hills" (*Stuart Baker*). The 2nd Everest Expedition obtained a specimen in the Chumbi Valley, Tibet, at *12,000 ft.*

Habits, etc:—The habits are very similar to those of our last bird, the Nepal Grey Tit. They do not appear however to be seed-eaters but live entirely on insects and fruit. They are very familiar birds in the hill stations, coming freely into gardens, but are common as well in the forest. It is found singly or in pairs but sometimes in parties. Stevens observed a party of fifteen or twenty, consisting wholly of these birds., foraging on the ground. They have various notes, and Whistler has the following interesting remarks:—

"Although without a proper song, this bird has a number of not unmusical calls, which are amongst the most penetrating and familiar of the bird sounds in a Himalayan station. One note is described as a

very loud four-syllable whistle, which may be written *ti-ti-tee-ti*, the third syllable much prolonged. Its ordinary spring call at the commencement of the breeding season is a mewing whistle. *pheeow* or *pawee*, while other calls may be syllabalised as *peewee* or *tweentwee* and *sit-here* and *teacher*". He also says it is very fond of bathing, doing so regularly morning and evening

They breed from April to June and their nests are made of hair, moss, etc and situated in holes in trees, walls, houses or even banks. They lay from 4 to 8 eggs, white in colour and blotched with red and reddish-brown. They measure about .72 by .52 inches.

Dr. Law found the young very difficult to rear, even with insect food.

Our species of the genus *Lophophanes* are very like *Parus*, only crested and the tail is square or slighty forked:—

A. Chin and throat black.
   a. White spots on wing-coverts; abdomen ferruginous... ... The Himalayan Cole-Tit
   b. No spots on wing-coverts; abdomen ashy-olive... .. The Sikkim Black Tit
B. No black on chin and throat.
   c. Lower plumage ochraceous.....The Brown Crested Tit.

3. The Himalayan Cole-Tit

Lophophanes ater æmodius (Hodgs).

Field identification:—A smaller Tit than those previously described. It has also got a crest. It is bluish-ashy above, with black head and a white patch on each side of the face, and another on the nape; there are two white wing bars and it is ferruginous below. Found only at high elevations in pine or oak forests, etc.

Description:—Length 4.2 inches; wing 2.4 inches.

The whole of the head and throat black except the cheeks, ear-coverts and a small patch on the nape, which are white; upper plumage bluish-ashy tinged with ferruginous on the rump; the wings have two white bars and the lower plumage is ferruginous. Sexes alike.

Iris dark brown, bill black; legs leaden-grey.

Distribution:—In our area—In Sikkim and the higher hills of the Darjeeling District from about *8,800 ft.* up to *12,600 ft*, where we obtained it at Changu. Stuart Baker gives it from about *6,000 ft.* but that is too low.

Outside our area:—Nepal and the Chumbi Valley; Stuart Baker received a skin from the latter place.

Habits, etc:—These birds are resident birds and even in winter occur as high as *12,000 feet*, where Stevens found them from January to March from Tonglu to Phalut. They are fond of the pine forests but also seek for food in scrub round villages, where Stevens came across them in severe weather at Lachung (*8,800 ft*). in Sikkim.

In habits they are like other Tits, going through the same acrobatic performances and are just as active in their search for insect food. They probably also feed on seeds and birds like the European species. They are not as common as the next species.

A bird with some eggs was sent to Stuart Baker from the Chumbi Valley, Tibet, where it was taken on the 13th June. The nest was composed of "rat fur, a well matted pad fitting into the bottom of the hollow". This was in a hole in an oak tree at betwen *10,000 and 11,000 feet*. The eggs were indistinguishable from those of the European Cole-Tit and measured about 17.9 by 12.9 mm.

The European Cole-Tit lays up to 9 eggs in a clutch and are, according to Butler (*British Birds with their Nests and Eggs. Vol. I, p. 153*) "somewhat elongated ovals, sometimes with the two ends alike, chalky-white when blown, though rose-pink when fresh from the nest; the surface is more or less sprinkled with pale-red dots, which occasionally are collected into a mass at the larger end; but, as a rule, the eggs of the Cole-Tit are not heavily marked."

4. The Sikkim Black-Tit.

Lophophanes rufonuchalis beavani. Blyth.

Field identification:—A crested Tit, larger than the last bird and about the same size as the Green-backed Tit. The head, neck and breast are black, and there is a white nape patch and a creamy white patch on each side of the face and neck; the upper plumage is bluish-grey and the lower ashy-olive A bird of high elevations and the commonest Tit of the fir and pine forests. It may easily be recognized from the last species by wanting the wing bars.

Description:—Length about 5 inches; wing 2 4 to 2.8 inches. Head and upper breast black; under the eye, ear-coverts and sides of the neck creamy-white; a white patch on the nape; upper plumage bluish-grey and lower

plumage ashy-olive; a few feathers under the wing, and the under tail—coverts ferruginous.

Iris dark brown; bill black; legs plumbeous.

Distribution:—In our area:—The higher hills of the Darjeeling District and Sikkim from *8,800* up to *12,000 feet*.

Outside our area:—Tibet and Western China. Ludlow found it common in the Chumbi Valley, Tibet, in winter but didn't meet it elsewhere. The first Everest Expedition got it in juniper forest at *12,000 ft.* in the Khama Valley, Tibet.

Habits, etc:—A bird of the same habitat as the Himalayan Cole-Tit, only much commoner, in fact the commonest Tit of those regions. The habits are the same as those of that bird.

The only record of the nidification of this bird is a note by Stuart-Baker (*Fauna of B I. 2nd ed. Vol 1, p. 86*). He writes: -"Two eggs sent by Mr. St. J. Hickley were taken at about 10,000 feet elevation from a hole in the roots of a small tree. The nest was a pad of hair and wool, and the eggs only differ from those of the last in being rather larger, measuring about 18.5×13.7 mm." The eggs which it resembles are those of the Simla Black-Tit (*L. r. rufonuchalis*) but, except for giving their measurements, he does not describe them.

The Brown Crested Tit.

Lophophanes dichrous dichrous (Hodgs).

Field identification:—A crested, small grey coloured Tit with a cream coloured half collar on the nape and ochraceous on the lower plumage. About the same size as the Himalayan Cole-Tit and inhabiting the same regions as the last two species and frequently seen in their company.

Description:—Length 4.5 inches, wing 2.7 inches, upper plumage brownish-grey; the sides of the head fulvous, mottled with brown; a cream coloured interrupted half-collar on the nape; chin and throat fulvous-grey and the rest of the lower plumage ochraceous.

Iris red-brown; bill black; legs plumbeous.

Distribution:—In our area—The higher hills of the Darjeeling District, where we obtained it at Tonglu and Phalut (*10,000 to 12,000 ft*). and in Sikkim from about *9,000 ft. up to 12,800 ft.*, where we collected specimens at Thangu.

Outside our area:—"Himalayas; South Kashmir; Garhwal, Nepal" (*Stuart Baker*).

Habits, etc:—The habits do not differ from those of the previous birds of this genus, with whom they may often be found in company as well as with other small birds, such as Willow-Warblers. Stevens writes:—"Less numerous in the interior of Sikkim, where I have noted a marked disparity of its numbers compared with the other Cole-Tits. Parties of this Tit, *L. a. aemodius* and *L. r. beavani* seen on numerous occasions, occupied taking food on the ground amongst the snow, particularly on the mountain slopes and summits in January and February."

B. B. Osmaston took several nests in the Tons Valley and wrote as follows (*Jour. Bomb. Nat. H. Soc. Vol. XIII, p. 542*):—"On the 14th April, 1899, while riding along the Chakrata-Simla road above Mundali, at an elevation of about 9,300 feet, I heard the characteristic call of this Tit from a neighbouring tree. I dismounted and, sending my pony on a short distance, awaited possible developments, sitting quietly on the bank. I soon saw the birds, a pair, in a wild pear tree (*Pyrus aria*) and had not long to wait before one of them disappeared into a small round hole in a dead branch near the top of the tree. I waited no longer, but having climbed the tree investigated the hole, out of which the bird now flew. The branch was quite rotten, so that I easily obtained access to the nest by enlarging the hole with my fingers. The nest was made of moss, lined with the fur of rats and flying squirrels, and contained 5 fresh eggs, white, spotted and blotched fairly thickly all over with chestnut markings." The average measurements were .67 by .51 inches. Stuart Baker writes:—"A second nest with five eggs was taken near Chakrata, similar to the other but lined with hair. This, too, contained five eggs measuring *.69 × .50 inches.*"

The Tits of the genus *Sylviparus* are small greenish birds with the head slightly crested and the tails slightly forked; the bill is shorter than in *Parus*.

6. The Yellow-browed Tit.

Sylviparus modestus modestus. Burton.

In both the 1st and 2nd editions of the *Fauna of British Birds*, this genus is given as having no crest but we found these birds continually raising the feathers of the crown most definitely crest-like; this was also confirmed by Mr. O'Donel and Mr. C. Rogers, of the Princetown Museum in America.

Field identification:—A small green bird with slightly forked tail, about the same size as a Gold-crest or Willow-Warbler and easily mistaken for them It raises the feathers of the crown into a decided crest and discloses a short bright yellow eye-brow, which is concealed when the feathers are not raised. It may be seen in parties, often with other birds, hunting the bushes and trees for insects.

Description: - Length 4 inches; wing 2.4 inches. Upper plumage olive-green, the centres of the crown feathers brown; a concealed short, bright yellow eye-brow: wings and tail brownish, edged with light olive-green, the former with two light olive-green wing bars; lower plumage greenish-yellow. Sexes alike.

Iris dark-brown; bill dark plumbeous, pale plumbeous on edge and at base of lower mandible; legs plumbeous.

Distribution:—*In our area*—In the Darjeeling District and Sikkim from about *6.000* up to *9,500 ft.*, at which elevation Stevens obtained several at Kalo Pokhri in March and April.

Outside our area:—"Garhwal, Nepal, Bhutan and hills N. of the Brahmapootra at least as far East as the Abor Hills" (*Stuart Baker*).

Habits, etc:—A rather local bird but common where found. We found it very common at Rambi (*7,000 ft.*) in the Darjeeling District in early December, when they were often seen hunting the bushes for insects in the company of green backed Tits, Chestnut-headed Babblers, Chestnut-headed Ixulus, Stripe-throated Sivas, etc. They are active little birds, continually on the move, and besides frequenting bushes they may be seen higher up in trees. We came across them again near Dow Hill (*6.100 ft*). near Kurseong in April.

Nothing is known about the nesting of this little bird.

The genus *Machlolophus* are large Tits, black and yellow in colour, with long pointed crests. They have like *Parus*, a broad ventral band.

7. The Northern Black-spotted Yellow Tit.

Machlolophus spilonotus spilonotus Blyth

Field identification:—A large black and yellow Tit with a pointed black crest: the upper plumage olive-yellow and black, and face and sides of neck bright yellow: a broad black band from chin down centre of breast and abdomen, with the sides of the breast and abdomen yellow Seen in the hills in parties and pairs, sometimes associated with other small birds.

Description:—Length 5½ inches; wing 3.1 inches. Crown of head, crest, a patch on sides of the nape, chin, throat and a broad mesial band down to the vent black; forehead, sides of the head, a broad eyebrow, nape patch and the sides of the neck bright yellow; sides of the breast yellow and the longer feathers of the crest tipped with that colour; remainder of lower plumage and back olive-yellow, the feathers of latter with black margins; tail bluish-grey and black, tipped with white and the outer webs of the outermost feathers white, wings black; quills edged with bluish-grey or white and the coverts broadly tipped with white. Sexes alike

Iris deep brown; bill dark horny; legs plumbeous.

Distribution:—*In our area*—Only found in the hil's from *4,700 ft.* up to about *12,050 ft.* Stevens found it at the lower elevation at Singhik, in Sikkim, in February. Meinertzhagen got it at Changu at the higher elevation on the 21st December, which is extraordinary. We have only found it between *6,000* and *7,000 ft.*

Outside our area:—"Nepal to Miri Hills north of the Brahmaputra, hills south of Brahmaputra to Looshai and Lakhimpur and? Chin Hills" (*Stuart Baker*).

Stuart Baker refers our Sikkim birds to the Northern Yellow-cheeked Tit (*M. xanthogenys xanthogenys* Vigors), in which the forehead and lores are black and the back wants the black margins to the feathers but our specimens appear referable to *spilonotus*. Oates, in the 1st edition of the Fauna, refers them to this species, as does Stevens in his *Birds of the Sikkim Himalayas* and Meinertzhagen in the "*Ibis 1927, p. 413.*"

Habits:—This is far from a common bird and very locally distributed. Stuart Baker found it entering compounds freely but we have never seen it do so here. In its movements it is very like the other Tits. We have seen it haunting low trees in the company of small Babblers etc., and at other times high up in trees by themselves. Stuart Baker writes:—"It is an early riser and its loud "Did-he-do-it. Did-he-do-it. No, he didn't" may be heard soon after dawn breaks. This call is generally uttered from the top of some tree, especially the first thing in the morning."

The same author gives the breeding season in the Khasia Hills from April to June and says:—"The eggs are laid in holes of trees, stone walls and, very rarely, banks. The nest is a pad of moss, grass and bits of bracken mixed with fur, wool or hair and with a layer entirely composed of the three latter on the top. The

eggs number from four to six and are white, boldly spotted, blotched and speckled with light reddish brown and a few underlying of pale neutral tint or grey." Mandelli took a nest containing three hard-set eggs at Lebong on the 15th June from a hole in a dead tree about five feet from the ground. The eggs measure about .78 by .55 inches.

The Tits of the genus *Ægithaliscus* are small birds with long tails. They have no crest and no ventral band.

a. Top of head chestnut; throat black.....The Sikkim Red-headed Tit.

b. Top of head black with fawn band down centre; throat silvery-white.....The Rufous-fronted Tit.

8. The Sikkim Red-headed Tit.

Ægithaliscus concinna rubricapillus Ticehurst.

(*Top figure in the coloured plate.*)

Field identification:—A pretty little Tit with a long tail. The top of the head is bright chestnut and the face mixed black and white; the back is dark grey; the throat black and underparts ferruginous. Usually seen in small flocks moving about restlessly in trees and bushes and commonly frequenting our gardens.

Description:—Length about 4 inches; wing 2 inches. Top of the head bright chestnut; a broad eyebrow and a broad moustachial streak white; the rest of the head and a large round patch on the throat black; upper plumage deep grey; wings and tail brown, with some of the feathers of the latter tipped with white; lower plumage ferruginous, rather paler near the black of the throat. Sexes alike.

Iris pale yellow; bill black, with the gape fleshy; legs buffy-yellow.

The typical race is not quite as big nor as deeply coloured as our bird.

Distribution:—*In our area*—Only found in the hills from *5,000 ft. up to 8,000 ft.*, where we have birds from near Sureil at the former and between Palmajua and Batassi at the latter elevations.

Outside our area:—"Sikkim to Mishmi and Miri Hills, over 4,000 ft." (*Stuart Baker*).

Habits, etc:—They are, as Whistler calls them, "fussy little birds", extremely active and with a terrible amount of energy for such small creatures. They may be seen

moving about trees or bushes, usually in small flocks, sometimes by themselves and sometimes in the company of other small birds and when in these hunting parties, as Whistler correctly says, they take a leading and conspicuous part. They cling upside down to branches in the same manner as other Tits and continually utter "a soft gentle *tcheck* or a harsh *trree*, both notes alternating" (*Whistler*). Whistler says they seldom venture into the open but our birds often do so. There is a cherry tree near the Museum in which they often may be seen. Although they may be seen low down in bushes, we have not seen them on the ground. Their flight is very weak and can't be sustained for any distance. They feed principally on insects but sometimes eat small fruits and seeds as well.

They breed from March to May. Their nests are beautiful little structures, ovoidel in shape and made of moss mixed with cobwebs, etc., and beautifully and warmly lined with soft feathers and seed-down. The nests of the typical race are usually placed in low oaks but sometimes have been taken as high up as 40 feet in a deodar; others have been found in tufts of grass, bushes, tangles of creepers, etc. The eggs are very small and sometimes nearly round, of a very pale pink colour with a zone of red freckles round the thick end. They measure about .56 by .45 inches.

9. The Rufous-fronted Tit.

Ægithaliscus iouschistos (Hodgson).

Field identification:—A small Tit of the same size as the last but not likely to be confused with it, as it keeps to a higher zone usually between *9,000* and *10,000* ft. The crown of the head is black, with a fawn central band, whereas in the previous bird the crown is wholly chestnut.

They may be seen in pairs or small parties keeping mostly to bushes and scrub jungle.

Description:—Length 4 inches; wing 2.2 inches. A broad band from crown to nape and collar on upper back rufous-fawn but purer on centre of the crown; rest of head black except the cheeks and back of ear-coverts which are ferruginous; upper plumage and tail olive-grey, the outer webs of the outer feathers of the latter white; throat silvery-white with the black bases of feathers showing through forming a darker line below the cheeks and on the point of the chin; lower plumage dark ferruginous. Sexes alike.

Iris. yellow; bill black legs yellow-brown *Distribution*:—*In our area*. Usually from *9,000 ft.* up to *10,000 ft.* but Stevens says during severe weather it may come as low as *8,000 ft.* Meinertzhagen found it as high as *12,200 ft.* near Lachen and at *12,000 ft.* in *January* at Sandakphu. Our specimens were collected in May at Tonglu about *10,000 ft.*

Outside our area:—"Nepal.....and Bhutan" (*Stuart Baker*).

Habits:—In its movements etc. it is very similar to the Red headed Tit but we have had few opportunities of observing it. Blanford wrote that it kept only to pine forests but nobody since his time has ever found it there. It keeps to rhodondendrons bushes, scrub and small trees and we have seen it on one occasion in bamboos. They may be found in small parties or even pairs and like the Red-headed Tit also join hunting parties with other birds. Nothing is known of their nidification.

In the genus *Melanochlora* we have an aberrant Tit differing from the other Tits in its long pointed wing and its nostrils being slightly exposed. They are birds of a large size with a long pointed crest.

10. The Indian Sultan Tit

Melanochlora sultanea sultanea (Hodgs).

Field identification:—A large bird for a Tit with the whole of the top of the head, including the long crest, and from the breast downwards bright yellow; the rest of the plumage black in the male which is replaced by greenish-brown in the female. They are birds of low elevation as a rule, commoner below than above *2,000 ft.* and go about in pairs or parties searching the forest trees and bushes for food.

Description: *Male* Length about 8 inches; wing 4.4 inches. The top of the head including the crest brilliant yellow; the lower plumage from the breast downwards bright yellow: the remaining plumage is black.

Iris dark brown; bill black; legs plumbeous.

Female and young. Resemble the male but the yellow is paler and duller and the black is replaced by greenish-brown and the chin and throat are yellowish-brown.

Distribution:—*In our area*. Found in the forests of the plains and foothills in the Duars; in The hills we have found it as high as *4,800 ft.* but they are commoner below *2,500 ft.*

Outside our area:—"The Lower Himalayas from Nepal, through Assam, North and South of the Brahmaputra to the Kachin and Shan Hills and to Arrakan. Birds from Karenni and North Siam are of this race". (*Stuart Baker*).

Habits etc. The Sultan Tit may often be seen near forest paths either in dense or light deciduous forest but they also frequent bamboo jungle and scrub They are not shy and go about either in parties or pairs and are very Tit like in all their habits, searching the trees for insects, fruits or seeds and clinging to the branches in various attitudes. They are rather slower in their actions than other Tits but are good acrobats nevertheless. The crest is only raised when they are excited unlike what is usual with other Tits. Their note is loud and shrill Baker likens it to that of the Grey Tit.

The only note on its nedification which we know of is that given by Stuart Baker in which he writes:—"A nest taken by me in N. Cachar on the 17th May, 1890, was similar to that of a Titmouse, a pad of moss with dense lining of cotton-down, placed in a crevice in a big bough of an oak. The eggs, seven in number, are like those of a *Machlolophus* and measure about 19.2×15.3 mm. They were on the point of hatching".

Notes on the Natural History and Shikar of Indian Deer

By

Colonel H. S. Wood, I. M. S.

(*Continued from page 49*)

9. The Kashmir Stag.

This animal, too, I have never seen or hunted. Excellent descriptions of it are given in Kinloch's and Darroh's books on Himalayan shikar.

[The Kashmir Stag, Barasingha (*Cervus hanglu*, Wagn.) or Hangul, belongs as does the Shou to the Red deer group, and the type locality is "Kashmir". The Kashmir name for this deer is *Hangal*. Blanford gives the distribution as "The Kashmir valley, throughout the pine forests, between about 9,000 and 12,000 feet in summer, lower in winter. Not found East or North of Kashmir; a few occur in Wardwan, Kishtwar, Badrawar, etc.; none in Ladak". Ward however says it does inhabit the Kashmir Valley to the North, and the Wardwan Valley is given as a summer resort of this deer; it also occurs in the Chamba State, where good heads are to be obtained. The hair on the neck is long and coarse, and that on the lower part of the neck is very long and shaggy, rusty in colour or very dark brown in old animals. The colour of the body is brown to dark liver with a white caudal disk; the lips, chin and inner parts of the buttocks white; the sides of the body are lighter than the back; and the stomach, especially in old stags, is dark brown. Ward says "The winter coat is very long, generally greyish brown; some animals are more rufous in colouring; in the summer the hairs are speckled and present a curious appearance, especially when the dense winter coat is being shed in patches. .....A hind had a well defined black line from the forehead almost to the nose, and smaller hinds have a dark dorsal line. The young are speckled white, but these spots are obliterated by the winter coat. Yearlings have a very decided fringe round the throat. Old hinds are often marked with white flecks".

The horns have brow, bez and trez and royal tines. Ward writes:—"There is endless variety in the shape of the horns; the normal head has 5 × 6 tines: some of the best are ten pointers." Eleven and thirteen points are commonly found, and sixteen points have been got.

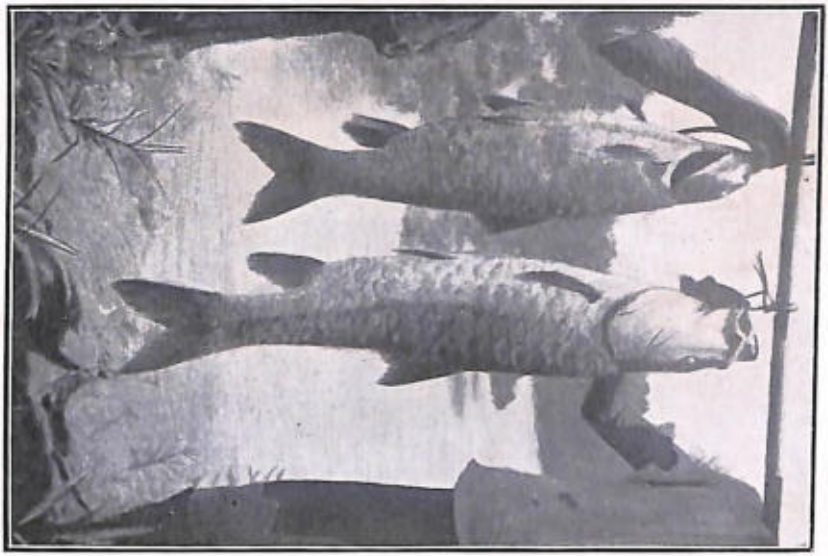
The tines are rarely divided and the bez, or second tine, generally considerably exceeds the brow tine in length. The average size of the horns is 40″ with a 5½ to 6 inch girth at mid beam, and Blanford says "the largest known measure 52, 53.5 and 55 along the inside from the burr to the tip; basal girth 2.5 clear of the burr; girth at mid-beam 7". Rowland Ward's record is of a head got in the Liddar Valley, Kashmir, and owned by C. Gilbert Rogers. It measures:—

50½″ Length on outside curve.
6″ Circumference between bez and trez.
21⅜″ Tip to tip.
37″ Widest inside.
6 × 5 Points.

The Kashmir Stag stands 48 to 52 inches at the shoulder and a fine stag will weigh over 400 lbs, but it is not always the heaviest stag that carries the finest horns The horns are shed from the middle of March to the middle of May but, according to Ward, young stags often carry their antlers into May. The new horns are not perfect till about October. Colonel Ward writes:— "After shedding their horns most go up hill and congregate under the snow line; as soon as the weather gets warm they cross the passes which lead to Kishtwar or the Wardwan, or else summer in the very highest ravines in the Sinde, Liddar or in the passes leading to Baltistan, etc.....When the rutting season commences about September 15th, all except the oldest and finest stags come down fairly low; there they remain with the hinds until about the end of October, then they wander off to horse-chestnut forests at about 8,000′ elevation.....

"In very hard winters, when the snow falls heavily in autumn, the stags come down low; they also do so when the green grass begins to grow in March, but heavy snow in February or early March does not cause them much inconvenience, for the buds of the birch and other forest trees are beginning to swell and on these they can browse".

According to Sir V. Brooke the voice of this deer resembles that of the Wapiti, differing from that of the European Red deer. "In the former it is a loud squeal ending in a more guttural tone; in the latter it is a distinct roar, resembling that of a panther". The young are born in April. The Kashmir Stag is said to do well in semi-captivity but the enclosure must be a large one. *Editor.*]



A 16 lb. Chocolate Fish, and 23 lb. Ordinary Mahseer.



The last morning's catch on the Confluence. Four ordinary Masheer 38, 21, 9 and 6 lbs., respectively, with a 15 lb. Black Mahseer in the centre.

The Mahseer and its Varieties in Burma.

After reading the interesting articles in your Journal, Vol. IV, No. 4 and Vol. VI, No. 2 by E. O. S., I thought that a few notes on my observations in Burma may be of interest to you and your Angling readers.

I give you here descriptions of the six varieties I caught in Burma on a trip lasting 19 days: I took each of the six kinds in exactly the same spot. I do not wish to deal at length here with my trip or weary readers with long accounts of fights with fish; I merely send you here my photos with descriptions of fish I took and the notes I made by the water's edge while I kept

Correction slip to "Some Fishing Notes by a Tyro"

On page 26 of Vol. VII, No. I, lines 6 and 7 should read as follows:—

"This channel is a mass of small streams. Chipra, where the Dhowla rejoins the Rydak, I believe used to be a....." (*Editor*).

Even to the experienced eye it is no easy matter.

In writing this article I wish only to solicit the opinions and aid of the angling community of your membership and to enlist generally the keen observations of the study of this fine fish.

It lies within the scope of the two provinces Assam and the Dooars, and Burma to bring to light the distinct varieties of Mahseer that are existent but little known. There is little doubt that in Burma and Assam, with their geographical dispositions, there is no rival for this form of fishing in the world, be it size, numbers or varieties.

It is little known perhaps that specimens of fish can be quite easily preserved and forwarded to the nearest Museum, where they will be greatly appreciated and by which means only we can arrive at the distinctions of these fish. This is a task for the giants in piscatology: our part as anglers is the capturing and forwarding.

Fully I realized this after my hours of toil and labour in sitting by the side of a river and describing these fish, in what I thought was grand style. The notes are, I am told, useless in detail even to the most imaginative artist.—the angler will distinguish at a glance the varieties of fish, and because, I suppose, we have more imagination!!

I kept the fish alive in the water beside me while I undertook this difficult task. They all fit the description of Dr. Day's *Barbus tor* in the main points, *i. e.* barbels, 'fin' rays, and lateral line, etc. (see photographs).

Firstly there is the common Himalayan Mahseer with a decided black line down the side. The second is the Thick-lip, which is also well known. Then comes the Black Mahseer, which is common both in India and Burma, where the banks of streams are overgrown with thick forest. The other three, as will be seen from the photographs, are quite different in shape, having a small head and thick stocky tail like a salmon.

I have called these fish the Copper Mahseer (which Thomas mentions as occurring in Assam, only the fins mentioned are vermilion in colour, whereas this fish's fins are sky blue), the Chocolate and the Red Mahseer. I give the descriptions for what they are worth.

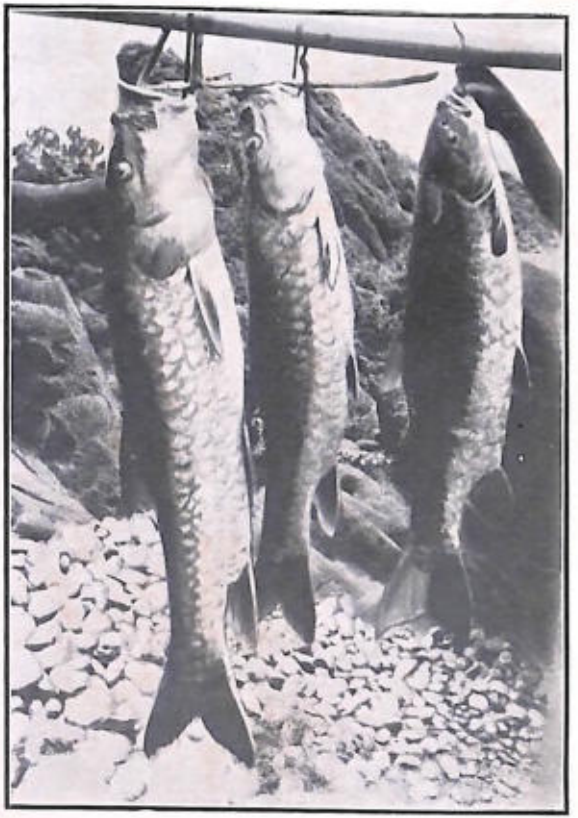
1. **Large Heads.** *The Golden or Himalayan Mahseer.*—This is the commonest and the same as the Indian fish (*Plates I & II.*)

He is long and narrow as a rule, with a distinct black line down his entire length, two half scales in width above the lateral line, head large and long, top half green, lower half pale green running into silver.

Above lateral line colour from golden with a mauve tinge on silver-grey background to a deep golden tinge running into dark green on the back. Below lateral line a beautiful olive-gold with a dull silver background. Fins blend with colouring; dorsal green and dirty pink, ventral and pectoral pale green to olive with red fringe. Eye: iris golden, pupil black. Belly white (probably the Greyhound type referred to by E. O. S.)

2. *The Thick Lipped Mahseer.*—(*Plate I.*) Same colouring as Himalayan Mahseer, differing only in the head. Chief features are the thick lips with the adipose extension, which is well illustrated in Thomas' 'Rod in India' and in the accompanying photo.

These are also common; best taken 44 lbs.



A 23 & 12 pounder of the ordinary type, with a 28 lb Chocolate Fish on the right.



A 44 lb. Thick-lip (left) and 25 lb. Copper Fish (right).

Small Heads. 3 *The Black Mahseer.*—(*Plate I.*) He is quite a different fish and of a stocky build. Head small and black, mouth small. Barbels and eyes black (probably E. O. S's small head or dark variety). This fish is marked by a jet black line two half scales above the lateral line, scales above having a tinge of gold on the scale tips running to jet black on the back. Below lateral line scales are lighter but dirty white, almost shot black to the scales on belly, which are dirty white with a black fringe. Fins black with grey at base. Best fish taken 19 lbs. Common in all the rivers of Burma, where the banks are thickly wooded.

4. *The Copper Mahseer.*—This is quite the most beautiful of all; he is bright copper all over with a sheen running into all the colours of the rainbow. He runs from the deepest shades of copper with a delicate mauve sheen throughout to the more delicate shades of copper with shell pink on a background of shot silver and gold. The head is small, the nose slightly concave, the lips are a modification of the thick-lipped variety, the adipose continuation of the lower jaw is clearly defined but very much modified and not as much pronounced as in the Thick-Lipped variety. Fins deep blue, except tail fin, which has a red fringe. Belly delicate shade of yellow, eyes bright copper, pupil deep indigo blue.

Three of this variety were caught; best fish 25 lbs.

5. *The Chocolate Mahseer.*—(*Plate II.*) Head round and square, like a *Labeo*. Colour bronze running through delicate shades into purple. No black line above lateral line. Above lateral line chocolate running into blue to dark chocolate on back, with polished bronze tinge to scale tips. Below lateral line running from faint silvery blue to white on belly to the extent of three complete rows of scales, with half row on either side clearly defined, making four.

Bright orange spots under lower jaw on chin; lips thin, fins sky-blue, iris chocolate, pupil black. Two fish of this kind taken; best 28 lbs.

6. *The Red Mahseer.*—Head small and round, top of which is shot gold and purple, also gill plates; mouth small. Above lateral line beautiful sea-green shot with silver, tips of scales salmon pink. Below lateral line, mauve with silver, vermilion scales; belly pink; fins all bright red.

Eye golden; pupil indigo blue. Took five of these fish; best 18 lbs.

These fish were all taken between the dates 12th April to 1st May 1928 at the celebrated confluence of the Mali and N'Mai Hkas, which are the two great rivers that meet 29 miles above Myitkyina and flow on as the Irrawaddi.

A. St. J. Macdonald.

Chance.

Teague and I were out on an elephant in the Tondu Forest. He was in front and I had given him my ball and shot gun with necessary ammunition. A Jungle Cock waited confidingly at the side of the road—an absolute sitter. Teague fired—the bird flew away. I cursed him for a Mug, until he discovered that he had fired off the left barrel, which he had loaded with ball.

Now if I declared that he had killed the bird with this, it would improve the story, but you would not believe me. There are few of us shikaris, however, who at some time or other have not had to thank chance, luck or the gods above (call it what you will) for some addition to our bag. Here are three of mine.

On an afternoon in Oct. 1908 I was enjoying a sleep in the house of the Deputy Commissioner of Dhubri—the headquarters of the Goalpara District.

Shebbeare maintains that it is always lucky for me to be asleep. I am not sure that that is quite kind, but only people with a clear office table and conscience can sleep in the afternoon (that's one up to me!). However I propose to test his theory when they draw the next Calcutta sweep.

A chuprassi woke me up to say there was a *Bagh* in the garden. I seized a gun and dashed out.

Municipal coolies, cleaning the road-side ditch, said a *Bagh* had growled at them from the culvert under the drive into the garden. The diameter of this was about three feet. I got down into the ditch and looked up this culvert from both ends, but could see nothing.

However they swore there was something there, so eventually I lay down in the ditch, a yard or so from the mouth, and fired blindly up the middle of the culvert. Then I saw the head of an animal sink to the floor. The coolies got a long bamboo and poked out a very nice Clouded Leopard. I was young and

inexperienced then—in after years I have realized how very foolish my action was. The leopard was facing in my direction!

(2). I had just changed into nice white clothes after a hard day's work (I have to put that in, because no one ever believes that I do any!), and was preparing to sit down to dinner in the Latiguri Bungalow. There were a lot of carts on the road in front, and hearing a commotion I went out to see what was happening. The drivers told me that a Tusker had come out several times and chased them. It was a dark night but I took my rifle and stood like a ghost behind a cart in the middle of the road.

He came out again just opposite me—I could just see his outline and fired where I thought his head was. Down he went into the borrow-pit 10 yards in front of me. Another risky act perhaps, but how many of your readers can shoot as straight as that on a dark night after two whiskies and sodas and several gin and vermouths?

(3). In Chittagong are nice fat Jungle Fowl. I saw a flock (is that the right collective term?), feeding in the paddy fields at least 30 yards from the edge of the forest. I managad to crawl within easy range and had a steady shot at the old Cock. He flew away and I was so surprised that I never let off the other barrel. I got up in disgust and then saw something fluttering at the edge of the forest. I had killed a Kalij Pheasant that I had never seen at all. You can work out for yourselves the distance he was from me. I never tell a lie.

J. H.

An unusual find.

I was playing bridge at McKean's place when an interruption, in the form of my syce with the extraordinary *khubber* that two leopards had been discovered in the stream at the bottom of the Garden, drove further thought of Bridge from my head. I excused myself, with what I am afraid must have been undignified haste, and made all speed to the spot. Fifty yards from the corpses I recognized with delight—to be short-lived—that the animals were actually two Clouded Leopards. On nearer approach I had a vague feeling that

something was wrong when 20 yards off my suspicions, beyond a shadow of a doubt, were confirmed: they had been dead for several days. Phew! very unwillingly, and with the heroic aid of McKean's head syce, I made an examination. They turned out to be two females taping 5′ 1″ and 5′ 6″. Death by poisoned bait suggested itself but I could find no trace of this. An examination of tracks seemed to point to an affair of love—what I mean is a ternific fight over some fortunate, or otherwise, male. The battle had been waged on a very steep cliff and of so fierce and concentrated nature that they appeared to have neglected the fact of a vertical 100′ wall and fallen straight down it to be killed on the boulders below. A sorry end for two such magnificent animals.

Gielle Tea Co.
Darjeeling District.

GEO. WOOD JOHNSON.

The Editor,

Journal of the Darjeeling Natural History Society.

Dear Sir,

A Snake Problem.

On the 28th December 1930 when in camp at Golaghat, where the Mahanandi enters the plains, news was brought that a large snake had been found dead on the east bank of the river.

On examination it was found to be a Hamadryad about 12 feet long and on its left side was a hole about two feet long with ribs showing. The ribs appeared to be of various lengths as if partly eaten or broken. From this hole protruded the tail of a python. The python on extraction was found to be about 6 feet long with its head apparently partially digested—at least, the skull was bare. The centre portion of the python was much distended.

I regret exceedingly that being indisposed and the smell and flies somewhat overpowering I could not make a more detailed examination of the two snakes but hope that some reader can suggest a likely cause of the death of the Hamadryad.

Yours faithfully,
D. A. G. D.

List of the Butterflies found in our area

By

C. M. Inglis, F. Z. S., F. E. S., E. M. B. O. U.

(*Continued from page 79*).

Family IX. Hesperiidæ.

Sub-family—Ismeninæ.

†536 *Hasora lizetta anura* De N.
The Lobeless Awl.
*537 *Hasora badra badra* M.
The Common Awl.
†538 *Hasora vitta* But.
The Plain Banded Awl.
†539 *Hasora alexis alexis* Fab.
The Common Banded Awl.
*540 *Hasora taminatus bharara* Fruh.
The White Banded Awl.
*541 *Ismene œdipodea ægina* Plotz.
The Branded Orange Awlet.
*542 *Ismene jaina jaina* De N.
The Plain Orange Awlet.
543 *Ismene anadi* De N.
The Plain Orange Awlet.
*544 *Ismene harisa harisa* M.
The Orange-striped Awlet.
*545 *Ismene vasutana* M.
The Green Awlet.
*546 *Ismene amara* M.
The Small Green Awlet.
547 *Ismene gomata gomata* M.
The Pale Green Awlet.
*548 *Rhopalocampta benjaminii benjaminii* Guer.
The Awlking.
*549 *Badamia exclamationis* Fab.
The Brown Awl.

Sub-family Celænorrhinæ

550 *Orthopœtus lidderdali* Elwes.
Lidderdale's Dawnfly.
551 *Capila zennara* M.
The Pale-striped Dawnfly.

*552 *Capila jayadeva* M.
The Striped Dawnfly.
*553 *Cetænorrhinus pyrrha* De N.
The Double-spotted Flat.
554 *Celænorrhinus pero* De N.
The Mussoorie Spotted Flat.
*555 *Celænorrhinus pulomaya* M.
The Multi-spotted Flat.
556 *Celænorrhinus tytleri* Evans.
Tytler's Multi-spotted Flat.
557 *Celænorrhinus flavocincta* De N.
The Bhutan Flat.
558 *Celænorrhinus patula* De N.
The Large-spotted Flat
559 *Celænorrhinus Sumitra* M.
Moore's Spotted Flat.
560 *Celænorrhinus plagifera* De N.
De Niceville's Spotted Flat.
*561 *Celænorrhinus leucocera leucocera* Koll
The Common Spotted Flat.
562 *Celænorrhinus munda* M.
The Himalayan Spotted Flat.
*563 *Celænorrhinus ruficornis area* Plotz.
The Tamil Spotted Flat.
564 *Celænorrhinus badia* Hew.
The Scarce Banded Flat.
†565 *Celænorrhinus nigricans nigricans* De N.
The Small-banded Flat.
*566 *Celænorrhinus dhanada dhanada* M.
The Himalayan Yellow-banded Flat.
†567 *Satarupa gopala gopala* M.
The Large White Flat.
†568 *Satarupa sambara sambara* M.
The White Flat.
*569 *Tagiades atticus khasiana* M.
The Common Snow Flat.
*570 *Tagiades gana gana* M.
The Large Snow Flat.
571 *Tagiades obscurus athos* Plotz.
The Suffused Snow Flat.
*572 *Tagiades menaka* M.
The Spotted Snow Flat.
†573 *Tagiades litigiosa litigiosa* Möseh.
The Water Snow Flat.
574 *Abraximorpha chamunda* M.
The Olive Flat.
575 *Odina decoratus* Hew.
The Zigzag Flat.

†576 *Mooreana trichoneura pralaya* M.
The Yellow Flat.
*577 *Daimio phisara* M.
The Dusky Yellow-breast Flat.
578 *Daimio bhagava bhagava* M.
The Common Yellow-breast Flat.
*579 *Daimio sinica narada* M.
The White Yellow-breast Flat.
580 *Daimio tabrica tabrica* Hew.
The Orange Flat.
581 *Coladenia indrani indrani* M.
The Tri-colour Pied Flat.
*582 *Coladenia dan fatih* Koll.
The Fulvous Pied Flat.
583 *Coladenia laxmi* De N.
The Grey Pied Flat.
*584 *Coladenia agni* De N.
The Brown Pied Flat.
585 *Coladenia agnioides* El.
Elwes' Pied Flat.
586 *Sarangesa dasahara dasahara* M.
The Common Small Flat.
587 *Darpa hanria* M.
The Hairy Angle.
588 *Cteroptilum vasava* M.
The Tawny Angle.
*589 *Odontoptilum angulata* Fd.
The Chestnut Angle.
590 *Caprona ransonnettii potiphera* Hew.
The Golden Angle.
591 *Caprona agama* M.
The Spotted Angle.

Sub-family—Hesperiinæ.

*592 *Hesperia galba* F.
The Indian Skipper.
593 *Hesperia oberthuri* Leech.
The Thibetan Skipper.

Sub-family—Pamphilinæ.

594 *Carterocephalus silvius shoaka* Evans.
The Northern Hopper.
595 *Carterocephalus argyrostigma avanti* De N.
The Orange & Silver Hopper.
†596 *Astictopterus jama olivascens* M.
The Forest Hopper.
*597 *Ochus subvittatus* M.
The Tiger Hopper.
598 *Ampittia dioscorides* F.
The Bush Hopper.
599 *Æromachus catocyanea Kali* De N.
The Blue-spotted Scrub Hopper.

*600 *Æromachus inachus stigmata* M.
The Veined Scrub Hopper.
†601 *Æromachus jhora jhora* De N.
The Dingy Scrub Hopper.
†602 *Pedestes masuriensis* M.
The Mussoorie Bush Bob.
*603 *Pedestes pandita* De N.
The Brown Bush Bob.
*604 *Arnetta atkinsoni* M.
Atkinson's Bob.
*605 *Iambrix salsala salsala* M.
The Chestnut Bob.
606 *Suastus rama rama* Mab.
The Small Palm Bob.
†607 *Scobura cephala* Hew.
The Forest Bob.
608 *Scobura cephaloides* De N.
The Large Forest Bob.
609 *Sunda swerga swerga* De N.
The Grass Bob.
*610 *Koruthaialos butleri butleri* WM.
The Dark Velvet Bob.
611 *Watsoniella swinhoei* Elwes.
Watson's Demon.
*612 *Kerana nigrita* God.
The Chocolate Demon.
*613 *Udaspes folus* Cr.
The Grass Demon.
*614 *Notocrypta paralysos alysia* Evans.
The Common Banded Demon.
*615 *Notocrypta feisthamelii alysos* M.
The Spotted Demon.
*616 *Notocrypta curvifascia* Fd.
The Restricted Demon.
617 *Gangara thyrsis thyrsis* F.
The Giant Red eye.
†618 *Erionota thrax thrax* L.
The Palm Red eye.
619 *Paduka lebadea glandulosa* Dist.
The Banded Red eye.
†620 *Pudicitia pholus* Den.
The Spotted Red eye.
†621 *Matapa aria* M.
The Common Red eye.
*622 *Matapa purpurascens* El.
The Purple Red eye.
†623 *Matapa druna* M.
The Dark-band Red eye.
624 *Matapa sasivarna* M.
The Black-veined Red eye.
*625 *Matapa shalgrama* M.
The Grey-brand Red eye.

626 *Hyarotis ardrastus praba* M.
The Tree Flitter.
*627 *Zographetus sativa* De N.
The Purple & Gold Flitter.
*628 *Zographetus ogygia ogygia* Hew.
The Purple-spotted Flitter.
629 *Plastingia nœmi nœmi* De N.
The Spotted Yellow Lancer.
*630 *Pithauria straumineipennis* WM.
The Light Straw Ace.
*631 *Pithauria murdava* M.
The Dark Straw Ace.
†632 *Halpe separata* M.
The Chequered Ace.
633 *Halpe aina* De N.
The Garhwal Ace.
*634 *Halpe gupta* De N.
The Olive Ace.
*635 *Halpe cerata* Hew.
The Northern Spotted Ace.
636 *Halpe hyrie* De N.
De Nicéville's Ace.
†637 *Halpe moorei* Watson.
Moore's Ace.
*638 *Halpe zema zema* Hew.
The Banded Ace.
*639 *Halpe kumara* De N.
The Plain Ace.
640 *Halpe knyvetti* Elwes.
Knyvett's Ace.
*641 *Halpe sikkima sikkima* M.
The Sikkim Ace.
*642 *Halpe homolea homolea* Hew.
The Indian Ace.
643 *Sebastonyma dolopia* Hew.
The Tufted Ace.
†644 *Cupitha purreea* M.
The Wax Dart.
†645 *Nicevillea gola* M.
The Common Dartlet.
†646 *Taractrocera danna* M.
The Himalayan Grass dart.
†647 *Taractrocera maevius flaccus* F.
The Common Grass dart.
648 *Padraona phellus phellus* Mab.
The Brandless Dart.
*649 *Padraona dara confucius* Fd.
The Common Dart.
†650 *Padraona sunias tropica* Plotz.
The Tropic Dart.
*651 *Telicota augias augias* L.
The Pale Palmdart.

*652 *Telicota pythias bambusæ* M.
The Dark Palmdart.
653 *Telicota palmarum* M.
The Plain Palmdart.
†654 *Augiades brahma* M.
The Himalayan Darter.
†655 *Iton semamora* M.
The Common Wight.
†656 *Baoris oceia farri* M.
The Paintbrush Swift.
*657 *Baoris plebeia* De N.
The Tufted Swift.
658 *Baoris brunnea* Snell.
The Dark Branded Swift.
*659 *Baoris sinensis sinensis* Mab.
The Large Branded Swift.
†660 *Baoris mathias mathias* Fab.
The Small Branded Swift.
*661 *Baoris pagana* De N.
The Figure of 8 Swift.
†662 *Baoris cahira austeni* M.
The Colon Swift.
663 *Baoris aurociliata* Elwes.
The Yellow Fringed Swift.
664 *Baoris cormasa* Hew.
The Full Stop Swift.
*665 *Baoris kumara moorei* Evans.
The Black Swift.
666 *Baoris philippina philippina* H. S.
The Philippine Swift.
*667 *Baoris tulsi* De N.
The Purple Swift.
*668 *Baoris assamensis* W. M.
The Great Swift.
†669 *Baoris conjuncta conjuncta* H. S.
The Conjoined Swift.
*670 *Baoris eltola* Hew.
The Yellow Spot Swift.
671 *Baoris discreta discreta* Elwes.
The Himalayan Swift.
*672 *Baoris contigua* Mab.
The Contiguous Swift.
*673 *Baoris guttatus guttatus* Brem.
The Straight Swift.
*674 *Baoris guttatus bada* M.
The Straight Swift.
*675 *Baoris zelleri colaca* M.
The Rice Swift.
†676 *Baoris bevani bevani* M.
Bevan's Swift.

THE JOURNAL OF THE DARJEELING NATURAL HISTORY SOCIETY

EDITED BY

C. M. INGLIS, F.Z.S., F.E.S., E.M.B.O.U.

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Game Birds of Sikkim, including the Darjeeling District, and of the Jalpaiguri District, Bengal.

By

The Editor regrets delay in issuing this number it is due to having had to arrange new printers.

[illegible] of the lower plumage of the cock is practically unique in the Game birds.

Beebe subdivides *Ithaginis cruentus* into two subspecies, his key to the two being.

In the cock.

Breast spotted with crimson.....*cruentus cruentus*.

Breast plain or stained with rusty.....*cruentus affinis*.

In the hens.

General plumage rufous-brown,

Warmer in tone; a crimson wash on throat.....*cruentus cruentus.*

Greyer in tone; crimson wash on throat very faint or absent *cruentus cruentus affinis.*

He gives the distribution of the two as:—*Ithaginis cruentus cruentus.* "The snowy mountains north of the Valley of Nepaul."

Ithaginis cruentus affinis. "Nepal and British Sikkim."

These differences however appear only to be individual. The amount of crimson on the breast of our Sikkim birds is very variable. In our private collection of seven cocks, five from Sikkim and one from N. W. Nepal, the amount of splashing is as follows. The Nepal bird is *very* boldly splashed: of the six Sikkim birds one is boldly splashed, one rather boldly splashed; two slighty splashed and two with no crimson spots. Stuart Baker writing in the *Ibis* for January 1915 says:—"After a most careful examination of all the females in the British Museum and elsewhere, and of the few which have come into my hands direct I can find no trace of crimson anywhere." But we find some of our speciments have some crimson feathers more especially under the eye. Stevens also found distinct traces of crimson on some of his.

(33). The Blood-Pheasant or Blood-Partridge.

Ithaginis cruentus (Hardw.)

The cock has the crown and crest buff the longer feathers of the latter grey with white shaft-stripes; forehead, lores and the bare patch on the face black; ear coverts black streaked with yellowish-white; upper plumage grey with white shaft-stripes broadening and edged with black on the rump and upper tail-coverts; lesser and median wing-coverts like the upper plumage the other coverts green with broad yellowish

shaft-stripes; chin and throat crimson with black bases to the feathers; foreneck ann upper-breast yellowish-green, the former with black bars and edges to the feathers and the latter splashed, in a varying degree, with crimson (some skins have no crimson spots at all); the remainder of the lower plumage applegreen; under tail coverts crimson tipped with greenish-white; tail creamy-white at tips shading into brown and the distintegrated margins crimson decreasing outwardly from the centre feathers, the crimson absent from the outer ones.

The bill is black: iris reddish-brown: cere and gape coral-red to crimson (according to Beebe salmon in winter); bare facial area scarlet and legs. spurs and feet scarlet; claws horny. The length of the cock is about 18 inches with a tail 3 inches long. The spurs are not always the same number on both legs. They vary from four to five. Beebe writes:—"By far the larger number (60 per cent.) of the cocks have two spurs on each leg: about 30 per cent. have a larger number than this, while only 10 per cent. have fewer than four spurs." Weight of cock 1 lb. 1 oz. to 1 lb. 4 oz. Young cocks about 2 months old have most of the upper plumage like the adult; the lower plumage is buff inter-mixed with green and crimson.

Younger birds are more or less mottled buff and black. The chick has the head grey with the centre of the crown, lores round behind the eye, broadening into a band round the nape and a streak below the eye joining the one behind the eye brownish-black the remainder of the plumage rufous. The hen has the crown and nape slatey-grey; the forehead, sides of head and throat crimson; the rest of the plumage reddish-brown finely pencilled with black.

The bill is black; the immature female has a coral-red bill blackish at the base. Cere and facial skin yellow-carmine: legs and feet deep brownish-carmine. The weight is 12oz. to 1 lb. 1 oz. "Over half the females show no signs of spurs; 20 per cent. more have a single blunt nodule on each leg, while

others show 0+2, 0+1 and 1+2. Very rarely they are fully developed into sharp functional spurs." (*Beebe*)

The distribution according to Stuart Baker is:—"Northern higher ranges of mountains in Nepal, the Gogra probably forming the Western limit and East to Sikkim and West Bhutan It is apparently common in the Chambi valley and in Sikkim it occurs as far south as the Singalila ridge and the Damsang range North west of Darjeeling" Stevens writing about Sikkim says:—"During the winter it occurs only sparingly on the Singile La Ridge at *ten thousand feet—twelve thousand feet*. It is plentiful in the interior of Sikkim at similar elevations throughout the *winter* keeping well within the snow-line, yet under exceptional stress of weather it is sometimes driven down to the clear ground below; this is more likely to take place on the outer ranges towards the end of March, and when this event happens the males generally announce their arrival, and if it is possible then to surround the patch of dense under growth, their stupidity gives every opportunity to secure them as they do not readily take to flight; a female was secured alive in this way, 23rd March 1912. It is somewhat surprising, yet at the same time gratifying to know they exist in substantial numbers along the mountain ranges in the interior, which is accounted for by their occupying the wilder tracts beyond the villages....."He also found them below Gnatong in March. In Sikkim we found them common at Thangu about *12,800 feet* and at Yumthang at *11,700 feet* in October; also at Changu in September. The former place is in the Lachen Valley and the latter in the Lachung Valley. We saw a number at Sandakphu *11,900 feet* in the same month, and again some between Sandakphu and Phalut in April when the ground was covered with snow. Beebe wrote that it is absent from the Darjeeling District which is not correct. Ludlow writing about the *"Birds of the Gyantse Neighbourhood"* (Tibet) says:—"this is the commonest Pheasant in the Chumbi Valley. In winter I have seen it in flocks of thirty and more individuals. It seldom takes wing. On one occasion I shot three birds on the ground in succession

out of a flock of twenty, without any causing any of their companions to take flight. They simply ran down the hill-slope".

The Blood-Pheasant inhabits the higher hills amidst the Pines (*Abies webbiana*) and rhododendrons. In Nepal, according to Hodgson they are found in ringal bamboo jungle. As winter comes on they descend and may be found amongst juniper but they do not always do this as Hooker snared some in January at an altitude of *12,000 feet* amongst heavy snow.

They are extremely gregarious birds going about in either small parties of half a dozen birds or so or else several families join up and then as many as forty may be found together. They are very tame birds and with little trouble a covey could be more or less wiped out. In cover when surprised they just scuttled about and never rose. While feeding they stopped at intervals, assumed an erect position and remained motionless. The hens, when disturbed, fully raised their crest and made rather a squeaky sound of lowish and three or four louder notes. On all occasions the crest of the hen is more noticeable than that of the cock; the only occasions on which we have seen the cock raise it was when frightened and when dusting himself. They generally move about in a leisurely manner with tail held low. On one occasion when frightened they dashed about, in zigzag fashion, with heads lowered, crest raised and wings and tail partly outspread. Although very tame they were very cautious and made frequent halts while feeding.

The hens are particularly inconspicuous while resting amongst the stems of bushes and so is the cock, if facing away from you and only showing his back. If he happens to be facing you, the red on the head and the light colour of the upper breast gleams and atonce attracts one's notice. In the open and short distance away, the general tone of colour is grey. Beebe writes:—"There is no doubt but that the colours of both sexes of *Ithagines* are at times protective. What I consider absolute proof of this came to me one day when I was watching a flock of the birds as they scratched and picked along a bit

of open rock slope. I had them all well within the range of my stereos and suddenly, without warning, every bird squatted, and turning its head sideways, stared unblinkingly into the sky over my head.....now the rocks in this instance were coated with pale pink primroses and brown lichens. So it was the females which matched more nearly the latter tint.....

"But as in the Blood Partridges, to be thus protective, the pattern of plumage need not exactly match the surroundings. The legitimate extent and application of protective colouration may be summed up in the female Blood Partridge. Clad in plumage of mottled reddish brown, she is yet conspicuous when making the slightest movements even among the brown-lichened rocks: she is inconspicuous when squatting, even among greenish grass or pink primroses."

With regard to their flight Beebe writes:—"When suddenly alarmed, a covey will rise in all directions, and, quail-like the flight is scaling, direct and brief. If opportunity offers, on alighting the birds prefer to run up-hill, but the first object is to reach and enter shelter, usually scrub rhododendrons, where they are safe from pursuit. If the underbush is more open, and one follows them up, they will be found separated, listening and watching intently, but so unsuspicious as to take a second glance at the approaching danger before running off again. If trees are near and the alarm comes from a sudden rush on the part of a dog, the covey will take to the lower branches."

When danger threatens them Beebe says the whole flock "give voice to a series of sudden, sharp notes—*seep*! *seep*! *seep*! After the scattered members of the flock have recovered from the alarm, they utter the covey call, which is only the alarm note drawn out—*see-e-e-e-e-lpe*! snapping off short at the end. I once heard a call uttered by a male when with the flock, something like *silpe-silpe-silpe-silpe*."

Blood Pheasants are rather silent birds and the only note I have heard besides the one already alluded to were when a hen which was sitting on eggs left her eggs and got under a bush and began calling, the calls somewhat resembled *Koi*! *Kwee*! *kwee*! *kwee*! I also heard another hen in the early morning calling from a stump the same call. I have also heard them utter a low *pirrh*! *pirrh*! while pacing up and down and trying to get out of a run. I have also heard a cock call from the ground and from a stump. His call seemed louder than that of the hen and the first note somewhat drawn out Blanford described it as like the squeal of a kite and this very fairly represents it.

Blood Pheasants are monogamous and the coveys one sees are composed of the parents and the young birds.

Beebe writes:—"In courting the male spreads its tail and wings, dropping the latter, raises the crest, swells out the breast feathers and struts before the female, turning round and round. The males fight fiercely with each other."

Blood Pheasants are quite good eating but apparently this depends much on their food. Hooker writes—"The principal food of the bird consists of the tops of the pine and juniper its spring; and the berries of the latter in autumn and winter: its flesh has always a very strong flavour and is moreover uncommonly tough." Blanford writes however:—"In their crops I found small fruits, leaves, seeds, and in one instance what appeared to me to be the spore cases of a moss; there were no leaves or berries of juniper, and the birds were excellant eating." Those we have tried have been quite good to eat. They are principally vegetarian in diet, besides the green food already mentioned Beebe adds the tender shoots of Bamboos, scarlet berries of some vine and pips of the wild white rose. They also east insects such as bettles, earwigs moths &c.

With regard to enemies little is known, man is one, to a certain extent, and is probably the principal one is exterminating

these birds from easily accessable localities. In 1880, Masson writes:—"Close to Mount Sundakpho, within one day, I shot 36 birds, out of which twenty-two were cocks." The same *sportsman* wrote 10 years later that this bird was no longer to be found along the Nepal boundary owing to forest chowkidars, snaring them all the year round. Beebe thinks foxes must be one of the principal natural enemies and among birds the Golden and Bonelli's Eagles.

Very little is known about the breeding of the Blood Pheasant Hodgson writes:—'The nest is placed on the ground amongst the grass and bushes, a loose nest of grass and leaves. The eggs ten to twelve in number, are laid towards the end of April and in May, and the young are ready to fly in July. Only the mother feeds and cares for the young. "In semi-captivity eggs were laid during April, May and June. Two eggs were found on the 9th April and another on the 23rd; two were found on the 18th May, another was laid on the 20th and a fourth on the 21st of May. An egg in my collection, which I owe to the generosity of Lt. Col. F. M. Bailey, C.I.E., was laid on the 25th June. The hen started sitting on the eggs laid in May on the 22nd and the chicks appeared on the 20th June which made 29 days incubation. The chicks unfortunately died probably killed by the Cranes or other birds. A nest which I saw was a mere depression in the ground with a few dead grass stems well pressed into it; it was well concealed beneath a bush. When sitting all that could be seen of the hen was part of her back and her tail. She always sat with her head facing the centre of the bush. Bailey watched a hen making her nest about 3 P.M. on the 21st April. Sitting under a bush she picked leaves and twigs from it and also roots from the ground which she tucked under her body. Later on she laid an egg there. My egg is an elongated oval, smooth to the touch, light rufous-buff in colour, in ground colour it can be matched by eggs of the Koklas; the marking consists of blotches and spots of a very rich brown, the smaller ones usually not so deep in colour. It measured 50mm. × 32mm.

Beebe writes:—"Unlike some species of Pheasants, these birds do not take kindly to captivity. Even in Darjeeling several attempts to keep Blood Partridges have ended in failure. The birds living less than two weeks." Those I saw in Bailey's fine aviary had already lived over three months and they looked well and healthy and as if they would live much longer. Perhaps Lt.-Col. Bailey can give us some information as to how long he has been able to keep them alive!

On June 3rd 1911 "a pair of Blood Partridges were successfully landed in England and placed in the London Zoo." They died soon afterwards due to unseasonable hot weather. Mr. W. Frost, the importer wrote to Beebe "that they were captured early in January, and during their voyage until their death, six months later, they were apparently in excellent health. They were dainty, rather fastidious feeders, with little liking for grain, although during the time when they were brought down from the hills the natives fed them solely on soaked paddy. In captivity they enjoyed salada-like foods, such as chopped lettuce, onions, potatoes and carrots and were keen on insects of all descriptions, roaches, beetles, grasshoppers and mealworms. The males did not care for each others' presence in the same cage, often pecking and plucking angrily at one another. The birds which the Bootias sometimes bring down to Darjeeling are apparently all hand reared, as they are young and very tame and show no signs of disfigurement from dashing against the cage tops. In the following year (1912) ten more Blood Partridges, together with eleven Tibetan Snow cocks were secured, but every one succumbed to the Calcutta heat, even before starting on their voyage."

From what I could observe by watching Bailey's birds I should say above 90 per cent. of their food is vegetable. They used to pick freely at grass and were very fond of lettuce. I only saw a few insects taken.

I have already published a lengthy account of this bird in captivity. (*Journal D. N. H. Sty. Vol. V. No. 3*).

(*To be continued.*)

Our Parrot-Bills or Crow-Tits.

By

C. M. Inglis, F.Z.S., F.E.S., E.M.B.O.U.

(with a coloured plate)

In the first edition of the *Fauna* these curious birds were placed in a sub-family of the *Corvidae* but now they are given the rank of an Order.

The bill is very deep and curved except in *Conostoma* and in most species the margins of the mandible are curiously sinuate.

They are highly gregarious birds and keep to the dense bamboo cover and reeds and also to scrub, &c.

Four out of the five genera are found in our area. The following key adopted from that in the *Fauna of British India* volume will serve to identify the genera.

A. Tail longer than the wing.

(*a*) Tail less graduated; outermost pair of feathers fully $\frac{3}{4}$ length of tail.....CONOSTOMA.

(*b*) Tail more graduated; outermost pair of feathers not more than $\frac{3}{4}$ length of tail.

(*á*) Height of bill more than length,

Commissure greatly curved.....PARADOXORNIS.

(*b́*) Height of bill less than length.

Commissure very slightly curved.....SUTHORA.

B. Tail about equal to or slightly shorter than wing.....PSITTIPARUS.

The genus *Conostoma* contains only one species which is the giant of the family. The bill is longer than deep and the tail which is longer than the wing is not greatly graduted.



PARADOXORNIS FLAVIROSTRIS.

Gould's Parrot-Bill.

½ Nat. size.

1. The Great Parrot Bill.

Conostoma aemodium Hodgson

Field Identification:—A brown looking bird about a foot long rather ashy below and with an orange bill, seen in pairs or small parties in thick bamboo growth at high elevations.

Description:—Length 12 inches; wing 5·2 inches; tail 5·5 inches. Forehead greyish-white; rest of upper plumage olive-brown tinged with rufous; a dark brown patch in the front of the eyes; wings vinous-ashy, the outer web of the secondaries tinged rufous; tail vinous-ashy more or less washed with rufous down the centre; lower plumage vinous-ashy, browner on the chin and throat.

Iris pale yellow; bill dull orange, lighter at tip; legs horny-plumbeous.

Distribution:—Sparingly found on the Singalela Ridge, Darjeeling District, but Stevens says it is more plentiful in Sikkim in the interior. Seen at elevations between *10,000 ft.* and *12,000 ft.* Stuart Baker says it descends some *4,000 ft.* lower in winter.

Outside our area:—"Nepal.....the higher ranges of hills of North Assam into Tibet and W. China" (*Stuart Baker*).

Habits etc.:—There is little known about this large Parrot-Bill. We have only seen it once when we came across a pair in a dense bamboo thicket near Phalut (*11,800 ft.*) in the middle of October. Hodgson wrote about it:—"It is a shy forester, adhering to the wilds, and tenanting the skirts of forests, where brushwood as well as trees abound. Five or six of these birds are usually found together, chattering, hopping and feeding on the ground, and resorting to trees and shrubs for shelter. Their food is principally insects in summer, but in winter, doubtless, they take some vegetable food. They inhabit the northern region of Nepal, close to the snows." Their flight is weak as it is in all members of this family and Baker gives its note as "a loud bleat."

Hume received two nests from Sikkim both found in ringal bamboos at an elevation of about *10,000 ft.* One, sent by Mandelli, was found in May. Hume describes the nest as the most perfectly hemispherical nest he had ever seen; very compactly made of grass stems. He describes the egg as "dull white sparsely blotched, streaked, and smudged with pale yellowish brown, besides which, about the large end, there are a number of small pale inky purple spots and clouds, looking as if they were beneath the surface of the shell." Only two eggs are known. Hume's measurements are 1·11 by 0·8 inches.

Stuart Baker writes (*Nidification of Birds of the Indian Empire Vol. 1. pp. 78. 79.*) "The only other known nest and egg was taken by St. J. Hickley at about 8,000 feet (or more) in Native Sikkim in Ringal jungle. These were sent to me and are very like those described by Hume. The nest is a deep cup of grass and reed-bark, lined with very fine grasses. It is typical of the nests of this family in being yellowish in colour, very compact and well built, though it has not got the finish or neatness of some of them. From the marks on the nest it looked as if it had been built in fine reeds or on grass-stems but the marks might equally well have been made by bamboo-twigs. There were two eggs but one was broken. The other has a white ground with a few specks and tiny blotches of reddish, sparse elsewhere but fairly numerous at the extreme larger end.

It measures 27·8 × 20·4 mm., whilst that sent to Hume is 28·1 × 20·8 mm., Hickley's egg was taken on the 27th June."

In the genus *Paradoxornis* the tail is much graduated and the bill short and deep with the cutting edge of the upper mandible deeply sinuate. The plumage is very soft and lax. Two species are found in India only one of which is found in our area both in the hills and plains.

2. Goulds' Parrot-Bill.

Paradoxornis flavirostris Gould

(*With a coloured plate*).

A fulvous brownish bird with dull rufous head white and black face and light yellow bill seen or oftener heard in ekra jungle in the plains and bamboos in the hills. They have a mewing cry and are great skulkers.

Description:—Length 7½ inches; wing 3½ inches; tail 4·2 inches. Forehead, nape and sides of neck rufous; rest of upper plumage fulvous-brown; wings and tail rufous; a large patch of white feathers below the eye with the dark bases showing giving it a scaly appearance; in front of eye, ear coverts and throat black; the chin white barred with black; lower plumage earthy or rufescent fulvous.

Bill waxy or bright yellow paler at the tip; iris deep red or red brown; legs plumbeous grey.

Distribution:—

In our area:—In the Duars where we have had them from Gorumara (*300 ft.*) and in the Titi forest between Hantapara and the Torsa river. Meinertzhagen also procured it a Rangirum (*6,300 ft.*) in the Darjeeling district.

Outside our area.—"From Nepal to the Chin Hills and the hills south of the Brahmaputra from the foothills up to 5,000 or even 7,000 feet." (*Stuart Baker*).

Habits etc.—This is a rare bird with us, both in the bills and the plains. Stevens never came across it, and the only

record for the hills is that of Meinertzhagen. He gives the following note:—"A small party seen in bamboo near Rangiroon (6,300 feet on 29· x 11·) when one was obtained .....I only had a momentary glance at this party, which was feeding close to a game track. Stomach contents seemed to be pure bamboo shoots." (*Ibis, 1927 P. 416*). We spent nearly a fortnight at Rangirum in the last week of July and first week of August but failed to locate it. We have only three specimens, two collected at Gorumara on the 28th November 1929 and one near the Hoolan in the Titi forest on 2nd November 1931. They were all found in high ekra and reeds near water and extremely shy.

Stuart Baker's notes on this bird in North Cachar are very complete and interesting, he says:—"This bird is not uncommon at a good many places about 3,000 ft., generally keeping to the valleys, where there is lots of sungrass or ekra jungle. It frequents, however, any sort of jungle other than deep forest. I have most often met with it in mixed grass and bamboos. Throughout the cold weather it is found in flocks, sometimes numbering as many as a dozen individuals, but more often only 7 or 8. It is a very shy bird and very chary of taking to flight, but is a great adept at concealing itself, so that one may often be within a few yards of a party, their movements shown by the waving of the grasses, yet never obtain a sight of one of them. When they imagine themselves free from observance, they often mount to the tops of the reeds and now and then take short flights into the air, nuch in the manner of some of the *Prinias*. This bird is undoubtedly in part a fruit-eater, for in the stomach of one I examined there were a few seeds, which proved to be the seed of a small plum-like berry, the fruit of a climbing plant, which was very abundant at the place where the bird was shot." (*Jour. Bom. Nat. Hist. Soc. Vol. VIII. p. 16.*) Stevens writing on the "*Birds of Upper Assam*" says. "Its striking whistle best represented by the syllables "phew," "phew," phew," "phuit," comencing in a low tone, which is increased in rapidity both in volume and

inflection, gives a certain clue to its presence." He also remarks "The noise made by their mandibles as they nibble at the flowers of the reeds and grasses is distinctly audible, through the birds may not be visible." He says the contents of the stomaches of those examined were "chiefly vegetable substances, seeds of "nul" grass, larvae, earwigs, etc."

Jerdon says he found them in pine forests in the Khasia Hills and that, although shy, they did not conceal themselves but flew from tree to tree.

Stuart Baker gives the favourite breeding height as "probably 3,000 to 4,000 feet," but says Tytler found it "breeding freely at 7,000 and 8,000 feet in the Naga Hills." According to the same author (*Nidification of Birds of the Indian Empire, Vol. I pp. 79-80.*)" The jungle generally selected for breeding purposes is undoubtedly bamboo and next to that secondary growth, especially such as is mixed, with grass and bamboos.....They seem to have a predilection for wet places and, even when breeding at high elevations, select small wet patches where there is some growth of grass, cane or reeds. As a rule they are not birds of true forest but may now and then be seen in quite deep forest at 3,000 feet upwards in places where the forest opens out for a space or where long grass and bamboo have obtained a footing."

Elsewhere (*Fauna of British India, Birds, 2nd edition. Vol. I p. 106*) he writes:—"It breeds in April and May and the early part of June, making a very compact, deep nest of soft grasses, a few shreds of bamboo leaves and the bark of reeds, will placed either in reeds, bamboo-clumps or bushes, low down and generally well concealed but sometimes quite exposed. The eggs are normally only two in number, sometimes three. They are pure white in ground colour, very sparsely speckled and spotted with tiny pinky-brown marks." He has found a nest with eggs on the 18th July. They measure about ·88 by ·66 inches.

In the genus *Suthora* the bill is slightly larger than it is deep but with the commissure only very slightly curved. The tail is greatly graduate and the plumage very soft and full.

Eleven species and sub-species are found in India, four of which occur in our area.

The following key may serve to distinguish the species.

A. A well defined black eyebrow.

(*a*) Upper plumage olive-brown, The Brown Suthora.

(*b*) Upper plumage orange-brown, The Black-fronted Suthora.

B. A short bright fulvous eyebrow.

(*c*) Crown bright fulvous: upper plumage olive yellow, The Fulvous-fronted Suthora.

C. Eyebrow absent.

(*d*) Crown bright chestnut, upper plumage rufous-brown, The Red-headed Suthora.

3. The Brown Suthora.

Suthora unicolor (Hodgson)

Field identification.—A brownish looking bird, greyish below with a black eyebrow, graduated tail and short deep curved bill seen in small parties in dense bamboo cover at high elevations.

Description.—Top of head rufous-brown; a well defined black eyebrow reaching to the nape: sides of head rufous-brown stippled whitish; upper plumage olive-brown tinged with rufous on wings and tail; lower plumage vinous-grey, dull fulvous on abdomen.

Bill greyish-white, brownish round the nostrils: iris stone-yellow; legs greenish-grey.

Distribution.—In our area: In the hills from *6,500* up to *11,200 feet.* Stevens obtained it at the lower elevation at Kedom in the Lachung Valley, Sikkim at the end of February and Meinertzhagen at the higher elevation at Changu in Sikkim on the 20th December.

Outside our area.—"The higher regions of Nepal. It extends to the mountains which lie between China and Tibet." (*Stuart Baker*).

Habits etc.—It is interesting to note that during the winter months birds were collected at both extremes of their limits. They apparently move about very little with the seasons. We, and most other observers, have always found them in the dense bamboo thickets that are so common in their habitat but Hodgson mentions finding them in thick brushwood, sometimes descending to the ground and often keeping to the tops of trees feeding on bugs and other insects. They go about in small parties and although the bamboos they frequent are very dense, they clamber about at ease and disappear quickly when alarmed. Those which Meinertzhagen came across disappeared into the thickest part of the bamboos and he never saw them again, which is always the case, but he heard chirrups and a sort of bleating sound for some time.

We have one specimen collected on Tiger Hill (*8,500 ft.*) about the end of September but they are scarce there. Between *9,000* and *10,000 ft.*, on the Singalela range they are not very scarce though one doesn't always see them on account of their rather skulking habits and the dense cover to which they keep. We have seven or eight specimens of this bird.

Nothing has been recorded about the nidification of this species. Birds collected by Stevens in May were not breeding but one we obtained, many years ago at Tonglu at the end of June was doing so, as the testes were greatly enlarged.

4. The Black-fronted Suthora.

Suthora politis humii Sharpe

Field identification.—A small bird about 4½ inches long orange-brown above with a broad black eyebrow, orange-chestnut patch on the face and black throat with a tit-like bill. Met with in small parties, sometimes in the company of other small birds hunting in dense bamboos, scrub, etc., at elevations above *4,500 ft.*

Description.—Length 4½ inches; wing 1·9 inches; tail 2·4 inches. Upper plumage orange-brown; ear-coverts orange-rufous rest of the face white; the closed wing is white on the outside then broadly black, then orange-rufous; tail orange-rufous and brown; chin and throat black margined with white; breast greyish-white and abdomen fulvous.

Iris brown; bill black; legs fleshy.

Distribution:—In our area:—In the hills from about *4,500* up to *11,200 ft.* The type locality is Darjeeling.

Outside our area.—It does not occur outside our area.

Habits etc.—Rather commoner than many of the others of this family but by no means common. It is still to be found on Tiger Hill *(8,500 ft.)* near Ghum where we observed it on the 18th November. We have only come across it between *7,400* and *10,000 feet* but Meinertzhagen secured it near Changu at *11,200 feet* on the 20th December and Stevens has has found it at *4,700 ft.* in February. They are resident and don't appear to move about much with the seasons. They are cheery, restless little birds usually seen in small parties keeping up a continuous chirruping note and hunting assiduously for

insects and seeds in the dense bamboos which they usually affect. They do however occur in tree and scrub jungle where Stevens has found them, either in pairs or small parties associating with other small birds in hunting parties. Their flight is weak as in other members of this family. Nothing is known of the nidification of this handsome little bird but one which we shot many years ago at Jorepokhri (*7,400 ft.*) on the 7th July, on dissection, proved to be breeding.

5. The Fulvous-fronted Suthora.

Suthora fulvifrons fulvifrons (Hodgson)

Field identification:—A small bird about same size as the last one but easily recognized by its general deep fulvous colour with grey abdomen. It is also seen in larger flocks numbering twenty or more and keeps to dense bamboos from about *8,500 ft.* upwards.

Description.—Length about 5 inches; wing 2·2 inches, tail 2·6 inches. Top of head, a short eyebrow, cheeks and from the chin to breast bright fulvous; a broad band on each side of the crown and upper plumage fulvous-olive; wings with some of the feathers edgedwith chestnut; tail blackish with the outer webs more or less chestnut; abdomen grey.

Iris red-brown; bill fleshy-pink; culmen above reaching to round the nostrils horny-brown; legs fleshy-brown.

Distribution:—*In our area*:—In the hills from about *8,500 ft.* up to *11,400 ft.*

Outside our area.—Nepal.

Habits etc.—In habits very similar to the last species but keeping exclusively to bamboo thickets. Meinertzhagen has an interesting note on this species. He writes:—Met with on two occasions, always in dense bamboo forest and in large flocks of thirty or more at Karponang (11,400 feet) on 20. XII. and the extreme south-west corner of Sikkim (9,200 feet) on

9·1. Stomach-contents in two cases mixed insects and bamboo, in three cases nothing beyond bamboo. On both occasions a continuous twittering was maintained while they ran up and down the bamboo poles in feverish hate to scrutinize them from top to bottom. Though they seemed to be looking for insects, few seemed successful in their quest. The January party seemed quite happy, though it was snowing hard at the time." (*Ibis 1927, p. 416.*)

Nothing is definitely known about the nidification of this little bird but Baker says Masson found it breeding on the Singalela ridge about *8,500 feet* in May but failed to find the nest. Masson's statements were however very often incorrect.

6. The Red-headed Suthora.

Suthhora ruficeps ruficeps (Blyth)

Field identification.—A larger bird than the previous two. About 6 inches in length with a bright chestnut head, the upper plumage rufous-brown and lower plumage white tinged with pink. It will probably be found in parties skulking in scrub jungle from about *7,000 ft.* upwards.

Description.—"Length about 6 inches; wing 3 inches, tail 3·2 inches. Forehead and crest to hind neck bright chestnut, sides of the head and neck paler; lower plumage white, tinged with pink on the breast; upper plumage rufous-brown, deeper on the tail and exposed parts of the wings; shafts of chin feathers distinctly black." (*Stuart Baker*).

"Iris bright red-brown; bill creamy or fleshy-white or pale horny; legs greenish plumbeous." (*Stuart Baker*).

Distribution in our area.—"Sikkim only" (*Stuart Baker*) Jerdon says he got it at Darjeeling.

Habits etc.—"A very rare bird found in Sikkim at 7,000 ft. upwards. The habits are probably much the same as those of the next bird." (*Stuart Baker*).

Stuart Baker surmises that its habits resemble those of the Black-browed Suthora. These birds are according to this naturalist inveterate skulkers in long grass and scrub-jungle creeping about low down out of sight and keeping up a constant twittering. They go about in parties of a dozen or more and when they think they are unobserved sometimes climb to the top of a long grass, chirp loudly and descend again. Their food consisted of small grasshoppers, beetles and seeds.

Nothing is known about the nidification of our species but Baker found a nest of the Black-browed Suthora which was composed of fine shreds of grass and reed-bark with a lining of the finest grasses but, under these, were a few scraps of bamboo leaves. It was bound together with cobwebs and placed in a bamboo clump growing on a grass-covered hillside. The single egg contained in the nest was a pale hedge-sparrow blue and measured 19·5 × 15·2 mm."

In the genus *Psittiparus* the tail is equal to or shorter than the wing and very slightly graduated. Four species and sub-species are found in India, two of which occur in our area. The following key will enable them to be distinguished.

(*a*) Crown of head rufous; chin white, The Red-headed Parrot-Bill.

(*b*) Crown of head grey; chin black, The Grey-headed Parrot-Bill.

7. The Red-headed Parrot-Bill.

Psittiparus ruficeps ruficeps (Blyth)

Field identification.—A rufous headed bird with olive-brown back and white beneath, about 7½ inches long and seen in parties of about a dozen or so in bamboos reeds, etc. Often with other birds and while feeding keeping up a constant chirrup and seldom showing themselves.

Description.—Length about 7½ inches; wing 3½ inches; tail 3½ inches. Whole head and nape chestnut; upper plumage olive-brown and lower plumage white tinged with buff.

Iris red-brown; bill upper mandible horny-brown, fleshy-pink at commissure near tip; lower mandible fleshy-pink with light horn-brown tip; legs plumbeous.

Distribution.—Found in the Duars, at Buxa (*2,000 ft.*) and in the Darjeeling district and in Sikkim from about *900 ft.* up to *4,500 ft.*

Outside our area.—"Hills north of the Brahmaputra east to Sadiya. Nepal....." (*Stuart Baker.*)

Habits etc.—Far from a common species and very local, Stevens says it is a partial migrant, this may be so but birds have been secured at both extremes of their habitat in the winter months. One we collected at Bhamanpokri (*900 ft.*) many years ago on the 25th January and one was collected by Shaw at Namchi (*4,500 ft.*) in Sikkim on the 16th December. Stevens says they occur irregularly in the rains in the Rungbong Valley. They move about in pairs or in parties of about a dozen or so, often in the company of other small birds. They are partial to bamboos, reeds, scrub and small tree jungle. Stevens once located three in the siris trees in the garden. In their search for food they keep up a continuous chirrup, they also have the bleating note common to other members of the family and which Baker says is so curiously like that of a kid in distress that he has been deceived by it. As is the case with

other Parrot-Bills their flight is weak and can't be sustained for any great distance. According to Baker they are very tit-like in habits when on trees. Their food is principally insectivorous but seeds and even grain are said to be taken.

Gammie took its nest at an elevation of *2,000 feet* in May. He wrote:—"It was seated among, and fastened to, the spray of a bamboo near the top, and is a deep, compactly built cup, measuring externally 3·5 inches wide and the same in depth, internally 2·7 wide by 1·9 deep. The material used is particularly clean and neat looking and has none of the second-hand appearance of much of the building-stuffs of many birds. The outer layer is of strips, or rather threads, of bamboo stems. There were three eggs ready for hatching off. They averaged 0·83 inches by 0·63 inches." The colour of the eggs according to Hume "is white, and it is rather thinly and irregularly spotted, blotched, and smeared in patches with a dingy yellowish brown, chiefly about the larger end, to which also are nearly confined the secondary markings, which are pale greyish lilac or purplish grey." (*Hume's N. & E. 2nd ed. Vol. 1 pp. 43 & 44*).

8. The Grey-headed Parrot-Bill.

Psittiparus gularis gularis (Gray).

Field identification:—A slightly smaller bird than the last with a grey head, black eyebrow and chin; rufescent-brown above and white below. Found in small parties, apparently keeping to themselves, in bushes and low tree jungle.

Description.—Length about 6 inches; wing 3½ inches; tail 3·1 inches. Head grey darker on the crown and nape; an eyebrow from the nostrils to the nape and the chin black; lower plumage white.

Iris red-brown; bill light brownish-orange; legs greenish grey.

Distribution :—*In our area* :—Found in the Duars at Buxa (*2,000 ft.*) and in the Darjeeling district and Sikkim from *2,800 ft.* apparently as high as *8,000 ft.*, from which elevation Mandelli sent a nest to Hume.

Outside our area.—"Bhutan and hills North of Brahmaputra." (*Stuart Baker*).

Habits etc.—There is little on record about this bird, Stevens apparently never came across it, he writes:—"Evidently rare and locally distributed. O'Donel secured it at Buxa (*2,000 ft.*) in December and we have about half a dozen specimens collected round Mangpu during June, July, November and December. Those we have seen were in small parties of about six or eight birds, in bushes and rather low tree jungle. We never saw them associating with other small birds and they were rather skulkers. Baker says their habits are similar to the last species.

Mandelli sent Hume a nest said to have been taken in Sikkim at *8,000 feet*. The nest was placed in a fork amongst the branches of a medium-sized tree and about 30 feet. from the ground. Hume also secured some eggs from Sikkim both nest and eggs resembled those of the last species. The eggs measured 0·82 by 0·61 inches.

The only other eggs known are a clutch taken by Stevens in the Miri-Daphla Hills. Stuart Baker writes about it:—"the nest was not described. It was apparently taken on the 2nd April at about 3,000 feet. The eggs are of the clay-coloured type of those of the Red-headed Parrot-Bill....."

Some Notes on Birds in Sikkim.

The following is a list of Birds observed between Gangtok and the Changu Lake on the main road to the Nathu La, during a short stay in May. The numbers are those in Stuart Baker's 2nd edition of the Fauna of British India (Birds).

7. *Corvus macrorhynchos intermedius.*—(The Himalayan Jungle-Crow). Occurs everywhere up to 13,000 ft.

22. *Urocissa flavirostris flavirostris.*—(The Yellow-billed Magpie). Not observed above 7,500 ft.

59 (*a*). *Parus monticolus monticolus.*—(The Green-backed Tit.) Seen up to 8,000 ft.

137. *Garrulax albogularis albogularis.*—(The White-throated Laughing-Thrush). Common from 6,000—7,000 ft.

161. *Trochalpteron affine affine.*—(The Black-faced Laughing-Thrush). A high elevation bird common from 8,000 ft. up to 12,000 ft. haunting the ringal forests and the dwarf rhodedendrons up to just below the snow line. Occurs in small parties or five or six.

311. *Leioptila capistrata capistrata.*—(The Black-headed Sibia). Common up to 8,000 ft.

326. *Sibia nipalensis nipalensis.*—(The Hoary Bar-wing). Observed between 9,000 and 10,000 ft. Seen only in pairs, not at all shy of human beings and permitted one to watch them through field glasses from 6 or 7 yds. away, while they conducted a tireless and acrobatic search of the moss covered boughs of dwarf trees.

333. *Siva strigula strigula.*—(The Stripe-throated Siva). Common in small parties up to 10,000 ft.

339. *Yuhina gularis gularis.*—(The Stripe-throated Yuhina). Observed at 8,000 ft. a party of five.

342. *Yuhina occipitalis occipitalis.*—(The Slaty-headed Yuhina). A pair seen at Karponang, 9,800 ft.

477. *Cinclus cinclus cashmeriensis.*—(The White-breasted Asiatic Dipper). A pair observed on the Changu Lake, apparently resident.

526. *Phœnicurus frontalis.*—(The Blue-fronted Redstart). One of the commonest birds from 10,000 ft. right up to 13,000 ft. haunting the grassy clearings where the Yaks graze, and the rocky snow-covered wastes above the Changu Lake. It was observed as low down as 6,500 ft.

534. *Chaimarrornis leucocephala.*—(The White-capped Redstart). Very common in all streams up to 13,000 ft. One pair was obviously breeding near the Karponang bungalow, but I was unable to find their nest.

535. *Rhyacornis fuliginosa fuliginosa.*—(The Plumbeous Redstart) Frequents all streams up to 11,000 ft.

541. *Grandala coelicolor.*—(Hodgson's Grandala). A small party of five observed at 12,600 ft. hunting for food after the manner of Starlings, pausing every now and then in an almost exaggerated upright pose to listen or look about. This bird was not seen below the snow line, but appears to be partial to places where the temporarily melting snow with the sodden moss and grass showing through, presumably provides it with food.

570. *Turdus merula albocinctus.*—(The White-collared Black-bird). Fairly common in the valleys about 11,500 ft.

636. *Siphia strophiata strophiata.*—(The Orange-gorgeted Fly catcher). Common in all the clearings from 7,000 ft. up to 11,000 ft., where as the country becomes more open, the bird was more frequently seen.

665. *Eumyias thalassina thalassina.*—(The Verditer Fly catcher). Seen up to 7,000 ft.

681a. *Culicicapa ceylonensis pallidior.*—(The Simla Grey-headed Fly catcher). Very common up to 7,000 ft.

614. *Myophonus cæruleus temminckii.*—(The Himalayan Whistling-Thrush). Very common everywhere up to 12,000 ft.

716. *Lanius tephronotus.*—(The Grey-backed Shrike). Several pairs seen from 10,500 to 12,500 ft., one pair haunting the banks of the Changu Lake which was under snow, and where they appeared to be breeding.

1121. *Emberiza fucata arcuata.*—(The Indian Grey-headed Bunting). One specimen seen hunting for scraps outside the Changu bungalow, in the snow, at 12,600 ft.

1149. *Krimnochelidon rupestris.*—(The Crag-Martin). A party observed at 8,000 ft. obviously breeding in some neighbouring cliffs.

1186. *Anthus hodgsoni hodgsoni.*—(The Indian Tree-Pipit). Observed at 9,500 ft. in small parties.

1194. *Anthus richardi thermophilus.*—(Blyth's Pipit). A few specimens observed at 9,500 ft.

1200. *Anthus roseatus.*—(Hodgson's Pipit). This was by far the commenest Pipit seen and was found in large flocks from 9,000 ft. to 12,600 ft. The haunts of this bird seem to be identical with those of the Blue-fronted Redstart, as they were always found together.

1266. *Æthopyga ignicauda ignicauda.*—(The Fire-tailed Yellow-backed Sunbird). A few birds seen from 10,000—11,500 ft.

1274. *Æthopyga nipalensis nipalensis.*—(The Nepal Yellow-backed Sunbird). One pair seen at 7,000 ft.

1364. *Dryobates darjellensis.*—(The Darjeeling Pied Woodpecker) Common up to 11,000 ft.

1452. *Cuculus canorus telephonus.*—(The Asiatic Cuckoo). Heard up to 6,000 ft.

1454. *Cuculus optatus.*—(The Himalayan Cuckoo). Heard up to 7,000 ft.

1456. *Cuculus micropterus micropterus.*—(The Indian Cuckoo). Heard up to 8,000 ft.

1458. *Hierococcyx varius.*—(The Common Hawk-Cuckoo). Heard up to 7,000 ft.

1755. *Ictinaetus malayensis perniger.*—(The Indian Black Eagle). One specimen seen at 6,000 ft. just above Gangtok. It is noteworthy that this was the only specimen of any kind of Hawk of Vulture observed during the whole trip.

1928. *Lophophorus impejanus.*—(The Monal). One cock bird seen at 10,500 ft.

1931. *Tragopan satyra.*—(The Crimson Horned Pheasant). Seen and heard from 9,000 ft. to 11,000 ft.

1959. *Arborophila torqueola torqueola.*—(The Common Hill-Partridge). Heard from 7,000 ft. to 11,000 ft.

2263. *Casarca ferruginea.*—(The Ruddy Sheldrake). One specimen spent the night on the Changu Lake. It had lost much of its accustomed shyness, and allowed me to watch it for half an hour from the shelter of a rock 20 yds. away.

2279. *Nyroca ferina.*—(The Pochard). One specimen spent two nights on the Changu Lane.

I also observed on the Changu Lake a Diver of sorts resembling a little Grebe but which seemed bigger, that I was unable to identify.

Many other specimens of birds were of course seen, but as I could not identify them for certain, they have not been included in the List.

GLENBURN T. E. W. H. MATTHEWS.

[We append a list of species, not in this list, which were collected by us between the same localities as also one or two obtained by Meinertzhagen. We also add one or two notes on some of the birds mentioned by Mr. Matthews.

22. *Urocissa flavirostris flavirostris.*—(The Yellow-billed Magpie). We obtained one at 9,000 ft. at Karponang in September.

46. *Nucifraga caryocatactes hemispila.*—(The Himalayan Nutcracker). One was collected at Changu at 12,600 ft. in September.

48. *Pyrrhocorax pyrrhocorax.*—(The Red-billed Chough). Seen and heard on the hills above Changu in September.

64. *Lophophanes ater aemodius.*—(The Himalayan Cole-Tit). Obtained at Changu, on the hills above the lake in September.

67. *Lophophanes rufonuchalis beavani.*—(The Sikkim Black-Tit). A fairly common Tit, specimens were collected between Karponang and Changu and at Changu in September.

73. *Machlolophus spilonotus spilonotus.*—(The Northern Black-spotted Yellow-Tit). Three specimens collected at Gangtok at 6,000 ft. in September. This must be a very local bird as this was the first time we had ever come across it in our area.

77a. *Ægithaliscus concinnius rubricapillus.*—(The Sikkim Red-headed Tit). A common Tit round Gangtok at 5,800 ft. where specimens were collected in September.

92. *Suthora unicolor.*—(The Brown Suthora). One collected at Karponang, 9,000 ft. in August.

108. *Sitta himalayensis.*—(The White-tailed Nuthatch). Collected at Gangtok at about 6,000 ft. in September.

123. *Dryonastes caerulatus caerulatus.*—(The Grey-sided Laughing-Thrush). Obtained at Gangtok, at 5,800 ft. in May.

140. *Ianthocincla ocellata ocellata.*—(The White-spotted Laughing-Thrush). Obtained at Karponang, 9,000 ft. in June

150. *Trochalopteron erythrocephalum nigrimentum.*—(The Sikkim Red-headed Laughing-Thrush). Several collected at Gangtok in May.

156. *Trochalopteron phoenicium phoenicium.*—(The Nepal Crimson-wringed Laughing-Thrush). A pair collected at Gangtok, 6,000 ft. in September.

161. *Trocholopteron affine affine.*—(The Black-faced Laughing-Thrush). We found this at Changu at 12,600 ft. in September.

214. *Pomatorhinus ruficollis ruficollis.*—(The Nepal Rufous-necked Scimitar-Babbler). This was obtained at Gangtok at 5,800 ft. in May.

226. *Xiphorhamphus superciliaris.*—(The Slender-billed Scimitar-Babbler). Procured between Karponang and Gangtok in June.

302. *Pseudominla castaneiceps casteneiceps.*—(The Chestnut-headed Babbler). This specimen was secured at Gangtok, 5,800 ft., in May.

321. *Actinodura egertoni egertoni.*—(The Nepal Barwing). Collected at Gangtok in May.

335. *Siva cyanouroptera cyanouroptera.*—(Hodgson's Blue-winged Siva). Obtained at Gangtok, about 6,000 ft., in September.

345. *Ixulus flavicollis flavicollis.*—(The Yellow-naped Ixulus). Several specimens collected at Gangtok in May.

351. *Leiothrix lutea callipyga.*—(The Indian Red-billed Liothrix). Collected at Gangtok in May, June and September.

353. *Cutia nipalensis nipalensis.*—(The Nepal Cutia). One secured at Gangtok in June.

354. *Pteruthius erythropterus.*—(The Red-winged Shrike-Babbler) Secured at Gangtok in September.

367. *Myzornis pyrroura.*—(The Fire-tailed Myzornis). Obtained between Karponang and Changu in September.

397. *Alcurus striatus.*—(The Striated Green Bulbul). Specimens collected at Gangtok in May and September.

455. *Certhia stoliczkæ.*—(Stoliczka's Tree-Creeper). Secured between Karponang and Changu in June.

471. *Pnœpyga squamata squamata.*—(The Scaly-breasted Wren). One specimen obtained at Karponang, 9,000 ft., in September.

477. *Cinclus cinclus cashmeriensis.*—(The White-breasted Asiatic Dipper). We failed to find any Dippers on the Changu Lake.

495. *Saxicola torquata indica.*—(The Indian Bush-Chat). A specimen was collected at Karponang, 9,000 ft., in September.

518. *Enicurus maculatus guttatus.*—(The Eastern Spotted Fork-tail). Several specimens collected near Gangtok in May

521. *Enicurus leschenaulti indicus.*—(Leschenault's Indian Forktail). A single specimen secured at Karponang, 9,000 ft., in September.

525. *Microcichla scouleri scouleri.*—(The Little Forktail). Collected at Gangtok in May.

571. *Turdus boulboul.*—(The Grey-winged Blackbird). Very common bird round Gangtok, often seen in the Residency

grounds where they build. Specimens collected in May and September.

587. *Geokichla citrina citrina.*—(The Orange-headed Ground-Thrush). Obtained at Gangtok in June and September.

599. *Oreocincla molissima molissima.*—(The Plain-backed Mountain-Thrush). Specimens collected at Changu, 12,600 ft., in June and September.

620. *Laiscopus collaris nipalensis.*—(The Eastern Alpine Accentor). We obtained this bird at Changu in August.

628. *Prunella strophiata strophiata.*—(The Rufous-breasted Accentor). Obtained at Changu in August.

635. *Hemichelidon ferruginea.*—(The Ferruginous Flycatcher). A specimen collected at Gangtok, about 6,000 ft. in September.

649. *Muscicapula melanoleuca melanoleuca.*—(The Indian Little Pied Flycatcher). Collected at Gangtok in May and September.

682. *Niltava grandis grandis.*—(The Large Niltava) Obtained at Gangtok, 5,800 ft., in May.

684. *Niltava sundara sundara.*—(The Indian Rufous-bellied Niltava). Several specimens collected at Gangtok in September.

685. *Niltava macgrigoriae.*—(The Small Niltava). Collected at Gangtok in May.

880. *Acanthopneuste trochiloides.*—(The Dull Green Willow-Warbler). Several collected at Changu in September.

882. *Acanthopneuste occipitalis coronatus.*—(Temminck's Crowned Willow-Warbler). Meinertzhagen obtained one near Gangtok, 6,400 ft., in December.

889. *Seicercus burkii burkii.*—(The Black-browed Fly-catcher-Warbler). Collected at Gangtok, 6,000 ft., and beyond Karponang, 9,500 ft., in September and June.

891. *Seicercus xanthoschistos xanthoschistos.*—(The Grey-headed Flycatcher-Warbler). Collected at Gangtok, 5,800 ft., in September.

894. *Seicercus castaniceps castaniceps.*—(The Chestnut-headed Flycatcher-Warbler). Obtained at Gangtok in May.

928. *Suya atrogularis atrogularis.*—(The Black-throated Hill-Warbler). Secured at Gangtok in May. They bred in the Residency grounds.

1041. *Perissospiza carnipes carnipes.*—(The White-wringed Grosback). One collected at Changu, 12,000 ft., in August.

1044. *Pyrrhula erythrocephala.*—(The Red-headed Bull-finch). Collected at Changu in September.

1049. *Pyrrhoplectes epauletta.*—(The Gold-headed Black-Finch). A solitary male seen and shot about 3 miles below Changu in September.

1051. *Hæmatospiza sipahi.*—(The Scarlet Finch). A hen bird shot between Gangtok and Karponang in September.

1055. *Propasser thura thura.*—(The Nepal White-browed Rose-Finch). A couple of specimens collected at Changu, 12,600 ft., in September.

1064. *Propasser edwardsii saturatus.*—(The Nepal Large Rose-Finch). Collected at Changu in September.

1076. *Procarduelis nipalensis nipalensis.*—(The Nepal Dark Rose-Finch). Several specimens collected at Changu in June, August and September. Those collected in June, on dissection, showed they were breeding but we failed to find any nests.

1105. *Passer rutilans cinnamomeus.*—(The Cinnamon Tree-sparrow). One secured at Gangtok, 6,000 ft., in September.

1115. *Fringilauda nemoricola nemoricola.*—(Hodgson's Mountain-Finch.)

1132. *Emberiza spodocephala melaneus.*—(The Yangtse Black-headed Bunting). Meinertzhagen obtained three at Karponang in December.

1166. *Motacilla alba dukhunensis.*—(The Indian White Wagtail). A number of white Wagtails were seen near the Changu Lake in September, one of which was collected.

1200. *Anthus roseatus.*—(Hodgson's Pipit). We found this bird up to 13,000 ft.

1272. *Æthopyga saturata saturata.* (The Black-breasted Sun-bird). Collected at Gangtok in May and September.

1303. *Dicæum ignipectum ignipectum.*—(The Fire-breasted Flowerpecker). Secured at Gangtok in May.

1315. *Pachyglossa melanoxantha.*—(The Yellow-bellied Flowerpecker). A cock secured above Karponang at 9,600 ft., in September.

1365. *Dryobates cathpharius cathpharius.*—(The Himalayan Lesser Pied Woodpecker). A female shot at Gangtok (5,800 ft.,) in September.

1383. *Blythipicus pyrrhotis pyrrhotis.*—(The Red-eared Bay Woodpecker). A female secured at Gangtok, 5,800 ft., in May.

1419. *Sasia ochracea ochracea.*—(The Indian Rufous Pienlet). Specimens secured at Gangtok in May and September.

1444. *Cyanops franklinii franklinii.*—(The Golden-throated Barbet). Specimens procured at Gangtok in May and September.

1455. *Cuculus poliocephalus poliocephalus.*—(The Small Cuckoo). A female shot at Gangtok, 5,800 ft., in May.

1457. *Hierococcyx sparveroides.*—(The Large Hawk-Cuckoo). An immature male collected at Gangtok in September.

1841. *Sphenocercus sphenurus sphenurus.*—(The Wedge-tailed Green-Pigeon). A female collected at Gangtok, 6,000 ft., in September.

1884. *Macropygia unchall tusalia.*—(The Bar-tailed Cuckoo-Dove). An immature male collected at Gangtok, 6,000 ft., in September.

1928. *Lophophorus impejanus.*—(The Monal). One male, one immature male and a female collected on the hills above Changu, 12,800 ft., in September, others were seen.

1931. *Tragopan satyra.*—(The Crimson Horned Pheasant). A single hen secured on the hills beyond Changu, 12,800 ft., in September.

1936. *Ithaginis cruentus.*—(The Blood-Pheasant). A pair secured where the Tragspan was shot on the same day in September.

2290. *Podiceps cristatus cristatus.*—(The Great Crested Grebe). A single bird was seen on the Changu Lake in September. It remained there two days but we were unable to secure it on account of its diving proclivities. It was raining but I watched it for a long time through binoculars. It may have been a bird of this species that Mr. Matthews saw.—(*Editor.*)]

NOTES ON THE NATURAL HISTORY AND SHIKAR OF INDIAN DEER.

By

COLONEL H. S. WOOD, I.M.S.

(*Continued from page 104*).

10. THE MUSK DEER.

I have never shot this deer for the reason that, where it is found, the shooting of it is strictly prohibited. This is on account of the musk pod with which the male is unfortunately provided. They were fiarly numerous in the Narkhanda forests, not very far from Simla. I only saw one once, it was sitting beyond the trunk of a fallen pine. It was pointed out to me by my Shikari but its colour so much resembled its surroundings that it was some time before I could spot it. It has tusks like a "Barker" and as everybody knows the musk is in much demand as a stimulant and aphrodisiac for mixing with tobacoo, and with civet it forms the basis of many of our best scents. It must be plentiful in Bhutan and Tibet also in the Mishmi and Aka country, as I have seen the tribes bring the musk pods into the Darrang district of Assam for sale at the *hats* and annual fairs.

[The Musk deer (*Moschus moschiferus*, Linn.) belongs to another subfamily *Moschinæ*. The native names are *Kastura* over most of the Himalayas; *Rebjo* in Ladak; *Rous* and also *Kastura* in Kashmir an *La* in Tibet. The type locality is given as "Tataria *Versu;* Chinam."

The distribution according to Blanford is "Throughout the Himalayas as far west as Gilgit, at elevations exceeding 8,000 feet (in Sikkim in the summer above 12,000) in forest and brushwood. Also in Tibet and other parts of Central Asia as far north as Siberia." They are plentiful on the ridge between the Chumbi Valley and Sikkim and a few are seen round Gyantse. The hair is very peculiar in texture,

long, coarse slightly wavy and pith like and is quite useless as a trophy. The fore legs are much shorter than the hind ones; there are no horns in either sex but the upper canines of the male are abnormally developed and measure from 2 to $3\frac{1}{2}$ inches. They grow downwards with a slightly backward curve.

The record tusk is 4". It was got from Kashmir and owned by Major-General H. C. Tytler. The records of the portion exposed from the gum is $\frac{9}{16}$" got in Chitral and owned by Col. C. H. A. Tuck. The ears are large and the tail is very small. The colour is rich dark brown more or less grizzled, the lower parts and inside limbs are paler and the chin, inner border to ears and inside of thighs are white. The height of the Musk Deer, at the shoulder, is about 20 inches and at the hind quarters about 22 inches. Ward gives the weight as "from 22 to 30 lbs." The young are spotted with white or yellowish-white.

The musk is in a peculiar glandular sac, in front of the preputial aperture in the male. The male also possess another gland on each side of the tail. The musk is only developed in the rutting season, which is said to be in January, and is a brown soft mass, an ounce being the average amount secured from one animal. Ward says as much as 32/- is sometimes paid for a muskpod, as the gland is called; so the animal is very largely poached, either shot or snared. Besides man Musk Deer have many other enemies, Ward mentions, "leopards, wild dogs, Indian martens, foxes etc."

The Musk Deer is a solitary animal seldom more than two being seen together. They much resemble Hares making *forms* in the forest where they lie up and feeding in the mornings and evenings. They do not feel the cold, sometimes making their bed in the snow. They frequent wooded slopes, and appear to be especially fond of birch forest. In the valleys round Gyantse they inhabit rocky country in the absence of forest. They are very sure-footed and progress by

bounds over the most dangerous country, steep hillsides or rocks. Their food consists of grass, lichens, leaves, flowers, buds and the tender shoots of bushes and trees. Where not hunted it is not at all shy. They utter a hiss when alarmed and a series of harsh screams when captured.

The natives usually snare them by means of nooses fixed in gaps between low constructed hedges sometimes these snares cover an extent of country of more than a mile. The Musk Deer instead of bounding over these hedges which they could easily do attempt to get through the gaps and are noosed.

Their is little sport in shooting Musk Deer and except the canine-teeth they have no trophy; the flesh however is excellent and free from all musky taste.

Either two or one young are produced and are born in June.

Kinloch says "When caught young Musk Deer may be easily domesticated, but many go blind and die." One, which belonged to a friend of his, did well on a diet of bread and milk, leaves and flowers and used to play with the children and a dog.—(*Editor.*)]

The Mouse Deer.

I could never work myself up to shoot this animal, I saw several in the Mysore jungles and also in the Feudatory States of Orissa. I confess I know nothing about its habits but in Mysore I always saw them in ringal jungle. They have very delicate small hoofs and I believe the canines form a kind of tusk. It has a curious gait and were it not for its spotted hide it might easily be mistaken for a hare.

[The Mouse Deer belong to a separate Section called *Tragulina* and there is only one Family *Tragulidæ*. This is split up in to two genera *Moschiola* in which the body is

spotted and *Tragulus* in which the body is unspotted. Two forms of the latter are found in Burma. We will first take:—

11. The Indian Chevrotain or Mouse-Deer. (*Moschiola meminna*, Erxl.) which is the one our author has seen. The type locallity is given as "India."

The colour of this little deer is brown minutely speckled with yellow; the sides are spotted with white or buff clongate spots passing into longitudinal bands; the lower parts are white and the throat has three white stripes. The upper canines of the male are long and the hair very fine and close.

The distribution according to Blanford is:—

> "Ceylon and Southern India in forest at elevations below 2,000 feet, extending northwards to Orissa, Chota Nagpur and the Eastern Central Provinces; also along the Western Ghats to north of Bombay."

They measure about 10 to 12 inches at the shoulder and weigh from 5 to 6 lbs.

Dunbar Brander describes them as "both mouse-like and deer-like." It hsa a peculiar walk on the tips of its hoofs.....

During the cold weather these little animals lead solitary lives in the jungle, and one occasionally flushes them by chance. In the hot weather they dwell in earths or in crevices between boulders. Under these conditions they are easily caught, and as many as five at a time have been smoked out of lair by using burning grass with the addition of a few chillis to add pengency to the smoke. The flesh is whitish in colour and most excellent eating. Pitman found them in the Central Provinces lying up in *forms* under rocks, bushes, dead trees and any convenient hollows in the ground, these were usually lined with dead leaves making a soft bed. There are usually two young born at a time, at the end of the rains or beginning of the cold weather. The rutting season takes place about June or July when the bucks keep with the does.

They are timid and gentle and do well in confinement. Dunbar Brander kept a number and found the bucks very quarrelsome. The only sound he heard uttered was "a feeble bleat."—(*Editor.*)]

We now come to the two species of Mouse-Deer found in Burma in which the body is unspotted and the tails long.

12. The Little Malay Mouse-Deer. (*Tragulus ravus*, Mill).

The Burmese name is*Yun* and the Malay *Kanchil, Pelandoc.* The type locality is given as "Trong, S. W. Siam (Abbot)." Blanford gives the distribution of this little animal as "Malay Peninsula and Islands, extending as far north as Yay in' Tenasserim, also in Cambodia and Cochin China. This species is common is Sumatra and Java."

The colour is brown above with a, more or less, rufous tinge, the back being nearly black in old animals; the sides are paler contrasting with the nearly black top of the neck. Inside the thighs, under the tail and the lower parts of the body white, the latter, more or less, mixed with rufous and with a central thin rufous or brown line down the breast, in front of which is a brown cross-band and an arrow-shaped mark on the fore-neck; there are three white stripes, the centre one with the arrow-head and the other two diverge, one on each side, outside of it; these join on the throat; the rump is rufous.

Blanford says the habits are very similar to those of the Indian Mouse-Deer and that it "inhabits dense thickets and is said to be very abundant in the mangrove jungle along the coast of Tenasserim and the Malay Peninsula. It is timid and very delicate, though it is easily tamed and occasionally has been known to breed in confinement. It produces one or two young at a time. Except the Royal Antelope, *Nanotragus pygmæus*, the present is the smallest living Ungulate."

(*Editor*).

13. The Larger Malay Mouse-Deer. (*Tragulus canescens*, Mill).

The Malay name is *Napu*. The type locality is given as the same for the last species.

This is rather a larger animal than the last one and appears to be slightly larger than the Indian Mouse Deer measuring 13 inches at the shoulder.

Blanford's description is:—"Upper parts yellowish or rufous brown, sides greyer..... Forehead and nape blacker, but the borders of the black area illdefined. Lower parts white, generally a brown median line on the breast, the chest and lower abdomen white and an intermediate tract brownish. Throat and foreneck brown, with 5 white bands more or less distinct, a median band on the chest and two oblique lines on each side in front on the throat. The white lines often become blended together. Rump rufous; tail brown above, white below."

The same author give the distribution as:—"The Malay Peninsula, extending north into Southern Tenesserim, and South to Sumatra, Java and Borneo."

The habits appear to be same as those of the other species.—(*Editor.*)

REVIEW.

The Nidification of Birds of the Indian Empire. By E. C. STUART BAKER, C.I.E., O.B.E., F.Z.S., etc. Vol. I. Corvidæ–Cinclidæ. Pp. xxiii+470; 8 pls. Taylor and Francis; London. Nov. 30th, 1932. Price 30 shillings.

We welcome the advent of Mr. Stuart Baker's first volume on the "Nidification of Indian Birds." Several years ago we suggested to the author that he should undertake this work and it fills a very long felt want. This, and the succeeding volumes, will make a very useful and necessary addition to the companion volumes of the "Fauna of British India" (Birds) by the same author. There is no ornithologist or oologist, in the world, who has the wide knowledge of the subject as Mr. Baker, a knowledge gained during over fifty years, most of which was spent in vigorous collecting and study. The author's reputation is a sufficient guarantee of the reliability of the information supplied.

Since 1889 when Oates published the second edition of Hume's "Nests and Eggs" the field knowledge of our Indian birds has increased tremendously; Mr. Baker, himself, during the fifteen years he was stationed in the North Cachar Hills, having added records of the nidification of nearly 300 species, at that time, new to science. In 1889 a little over 48 per cent. of the eggs of the families and genera, included in this volume, was known; whereas in the present volume the breeding habits of over 82 per cent. are recorded. The species included in this volume are those of Vol. I of the "Fauna" with the addition of the Cinclidæ and the nidification of 408 species and subspecies is given.

There is a very complete, interesting and instructive Introduction reviewing Indian Ornithology and Oology for the last hundred years; from the time when the first volume of

the "Journal of the Asiatic Society of Bengal" appeared in 1832, down to the present day. It was not till Hume's time that the study of Indian Oology really began and his strong appeal for help soon brought him numerous correspondents. In this Introduction the author gives very good reasons for not merely bringing out a new Edition of Hume's great work.

In Hume and Oates' day only species were recognized and to have gone through Hume's large collection and sorted them out into their subspecies world have meant years of work. Mr. Baker's own vast collection, formed by a "careful selection from over 200,000 eggs," implemented by the whole of the most important Indian collections of recent years, besides a large amount of material received from many correspondents, was quite sufficient to start the work *de novo*. Hume's great work has also, of course, been quoted where first hand knowledge was not available. The Introduction alone is well with the cost of the whole work.

The same numbers are used for each species as in the "Fauna" and the classification has only been altered in accordance with corrections accepted since the publication of these volumes. To each bird is assigned a breeding area, a description of the country in which its nest may be sought for where this has been possible, and then descriptions of the nest and eggs. Where possible all the available information has been summarized but where the notes are scanty, they are given fully and often the finder's own letters are quoted.

Although the account is so complete there is still much to be done in Indian Oology, such as, which sexes construct the nests and incubate the eggs; the time taken in incubation and especially the nature of the country in which the birds breed. In this volume alone there are 78 species and subspecies of which the nidification is unknown. In our own area information is still required about 16 species, besides a few ochers of which the records are doubtful. Even the nidification of such a common bird as the Sikkin Red-headed Tit

(*Ægithaliscus concinna rubricapillus*) does not appear to have been recorded as yet.

We note an omission of the breeding of the Himalayan Cole-Tit (*Lophophanes ater æmodins*). This is given in the Fauna volume but is not included in the volume under review. Some of the breeding reasons will have to be amplified and altered for some of our birds.

This volume, the first of four, is illustrated by eight excellent plates from photographs, two by the author and the rest by Col. Rattray and Capt. Bates.

We congratulate the author on his fine work and can thoroughly recommend it to *all* interested in Ornithology and Oology, as it is accurate and written in a style which is as suited to the novice as to the most experienced Oologist.

[Editor.]

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JOURNAL

OF THE

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Vol. VIII. No. 1.

Game Birds of Sikkim, including the Darjeeling District, and of the Jalpaiguri District, Bengal.

By

C. M. INGLIS, F.Z.S., F.E.S., E.M.B.O.U.

(Continued from page 125 of Vol. VII).

Our next genus is *Excalfactoria* which contains the Blue-breasted Quails. The sexes differ greatly in colour and the tail has only 8 feathers. The legs are without spurs.

(34) The Blue-breasted or Painted Quail.

Excalfactoria chinensis chinensis (Linn).

The cock has the upper plumage fulvous-brown with broad black bars and yellowish-white shaft-streaks, except in very old birds when these streaks tend to disappear. The wings are fulvous-brown, the coverts the same colour but mixed with dark bluish-grey and chestnut. The tail is slaty-blue broadly edged with chestnut in younger birds, and wholly chestnut in old ones. The sides of the head, upper breast and flanks are dark bluish-grey and there is a narrow white line from the nostrils to the eye; also a narrow streak of white from the gape broadening below the ear-coverts and surrounded by black. The chin and throat are black and there is a broad white gorget on foreneck

running up each side to the ear-coverts and bordered with black. The remainder of the lower plumage is chestnut. The amount of chestnut varies much in different individuals, in old birds it sometimes covers nearly the whole of the lower plumage.

The bill is black with the upper mandible edged and most of the lower one slaty; the iris is crimson, the legs and feet bright yellow.

It measures about 5½ to 6 inches, with a wing about half that length and the tail is about 1 inch. The weight is from 1½ to 2 ozs.

Young cocks resemble the hen above but most of the lower plumage is rather strongly barred with blackish-brown. The black chin and throat with white cheek patches and gorget appear and the flanks are washed with slaty-blue; then a few spots of chestnut on the sides of the abdomen and below the tail; the amount of the chestnut varies much among birds of the same covey. The chestnut then gradually covers the middle of the breast, abdomen, and sides leaving only the flanks slaty-blue; lastly the narrow white streak from the nostrils to the eye appears.

The chick in down has "The whole body and head, above and below, brown with the following exceptions which are buff; coronal streak and a streak on either side of the crown, tips of the wings, sides of the head, chin and throat. The brown of the under parts is rather paler than that above and is somewhat dusky in tint." *(Stuart Baker).*

The hen has the upper plumage like the cock but without the slaty-blue and chestnut on the wing-coverts; the tail is like the rest of the upper plumage. The sides of the head are rufous and the chin and throat fulvous-white. The rest of the lower plumage is buff barred with black on the breast and flanks.

The bill is generally more plumbeous than in the cock; the iris is deep brown to reddish-brown in old birds; legs bright yellow.

Hens measure about the same as cocks but may average very slightly larger. Weight 1½ to nearly 2¼ ozs.

Stuart Baker gives the distribution of this little Quail as follows :—" Practically all India and Ceylon in suitable country and all Burma. It is a common breeding-bird in Travancore and the Malabar coast to Bombay; it is rare in Madras and South-East India, becomes more common in North Orissa, Eastern Bengal and Behar and is very common in Assam and Western Burma. It is rare or absent from the North-West of India, west of a line drawn from Bombay to Simla. Outside India it ranges East through the Indo-Chinese countries to China and Formosa and South into the Malay Peninsula."

With regard to our area Stevens doesn't mention it in his "*Birds of the Sikkim Himalayas*" and neither Shaw nor ourselves have come across it in the hills. There are, however, four skins in the British Museum from the Tweedale Collection labelled " Darjeeling " and an adult cock collected by Pearson and presented by the Indian Museum also labelled " Darjeeling ", so that, unless these have been wrongly labelled, this bird must occur or have occurred in these hills. Hume says it " breeds.....in the warmer valleys of the lower outer ranges of the Himalayas from Sikkim to near Kasauli. "

In the Duars they appear to have a slight local migration. O'Donel has only seen them during June and July when they were fairly plentiful. They appear to go further south in the cold weather as we secured a cock, a hen and three immature birds at Jalpaiguri on the 7th January. There is an immature cock in the British Museum collected

by one of Mandelli's collectors in the "Bhutan Duars" in February but we don't know from which part of the district this was collected.

These handsome little Quail are generally seen in pairs or else small coveys consisting of the parents and their young; there may be several of these family parties in the same patch of grass but they are quite independent of each other. Their requirements are grass lands either thin short grass, tall thatching grass or thin bush and scrub jungle but they must have a plentiful supply of water. They may also be found in the *ekra* jungle bordering swamps but come out to feed in the thinner grass retiring to the denser jungle during the heat of the day. In Goalpara we commonly put them up in the morning and evening, from the short grass bordering the roads through the tea. Stuart Baker writes :— "In the hills where there were but few swamps they were quite content with grass lands through which a stream or two found their way and, in North Cachar, I several times put them out of the dense secondary growth which grows up in deserted cultivation. They were also to be found in standing crops of hill-rice, millet, etc., and in sugar cane". Those we got at Jalpaiguri were in paddy lands near a large patch of grass.

Both Hume and Baker found these Quail very difficult to put up again once they had been flushed. Baker writes they run, dodge and hide so cleverly that even a good dog has all his work cut out to make them rise." We had no difficulty in securing the five birds we required from a covey.

They are quiet little birds, seldom heard unless a pair gets separated or when flushed suddenly. The call is a low, soft whistle, according to Davison, like *pi-oo* but when flushed suddenly they utter, very quickly, a sharp note like *tir, tir, tir.* Another note, mentioned by Baker, is the hen's call to her young sounding like *ti-yu ti-yu.*

They feed mostly on grass seeds and grain but also take small insects and, according to Baker, the young at first are fed entirely on these.

Their flight is low, fast and straight for fifty yards or more when they suddenly drop into cover. It is a pity to shoot them as when brought to bag they are such tiny morsels as to be hardly worth putting on the table.

These Quail are monogamous and the hen apparently does all the sitting on the eggs. The breeding season varies according to locality but, according to Baker, it breeds at odd times practically throughout the year and, in Assam, he has records of eggs in every month. They breed both in the plains and hills and in the Naga Hills, in Assam, they have bred as high as 7,000 feet. They principally breed in grass lands but sometimes in bamboos and scrub jungle. The nest is a mere depression in the ground, sometimes lined with a few grass stems. The eggs number 4 to 7, seldom 8. They are broad ovals, rather pointed at one end and vary in colour, according to Baker, from "a pale yellowish or olive-clay to a warm olive or pure brown." They are usually unmarked but some are more or less speckled with brown. Baker gives the average measurement of 100 eggs as 24·5 × 19·0 mm.

With regard to this bird in captivity Finu writes :—"It turns out to be a most interesting pet, hardy enough to bear our English winters in an out-door aviary, and a free breeder if growing grass can be provided for it to nest in. The cock is a most attentive husband, calling his hen to take any tit-bit he may obtain, after the gallant fashion of the common fowl. He occasionally utters a tiny crow, resembling a miniature imitation of the "brain-fever-bird's" note. The hen is a prolific layer in captivity, and a good sitter and mother, and the chicks are easy to rear, and the most charming little creatures imaginable ; they are literally no

larger than the big black bees we are all so familiar with in India, and they can squeeze through half-inch wire netting! Although they take almost as long to hatch as common fowls, they mature with remarkable rapidity; Mr. Meade-Waldo, who was the first to breed them in England, found that his young cocks, when only just over a month old, had already assumed the proper plumage of their sex, and were actually crowing and calling their little sisters to feed! It is therefore very obvious that, though this minikin Quail can hardly be regarded as game, it is pre-eminently suited for a pet; ordinary bird-seed keeps it well, with the addition of a few insects and crumbled hard-boiled egg for the young."

(To be continued).

The Nuthatches of our area.

By

C. M. INGLIS, F.Z.S., F.E.S., E.M.B.O.U.

(With a coloured plate).

The Nuthatches belong to the family *Sittidæ* and like the Woodpeckers and Tree-Creepers climb about the trunks and branches of trees, one of our Indian species favours rocks. They are extremely expert at this, more so than the Woodpeckers and Tree-Creepers and may be seen moving about quickly, in any position, sometimes head downwards, nor do they require the support of their tails as do those other birds.

The Nuthatches are small birds with stout straight bills, short square tails only slightly rounded and long hind-toes. Only four out of a dozen Indian species and sub-species are found in our area. They are easily identified.

A. Upper plumage slaty-blue :

a. Middle pair of tail feathers white at base ; lower plumage rusty-fawn ... **The White-tailed Nuthatch.**

b. Middle pair of tail feathers wthout any white : lower plumage chestnut-brown in the male, chestnut in the female ... **The Cinnamon-bellied Nuthatch**

B. Upper plumage black, streaked with brilliant blue ... **The Beautiful Nuthatch.**

C. Upper plumage purplish-blue : forehead black ... **The Himalayan Velvet-fronted Nuthatch.**

1. The White-tailed Nuthatch.

Sitta himalayensis Jardine and Selby.

(At bottom of coloured plate).

Field Identification :—A small bird, slaty-blue above and rusty-fawn below seen climbing about the trunks and branches of trees, often head downwards. Never found below *3,000 ft.*

Description :—Length nearly 5 inches ; wing 2·9 inches ; tail 1½ inches.

Upper plumage slaty-blue, with a black band through the eye to the shoulders ; central tail-feathers slaty-blue with a white patch at the base, the others black with oblique white bands ; lower plumage rusty-fawn deeper on the flanks, vent and under tail-coverts. Sexes practically alike.

Iris pale brown, bill black, bluish-white below ; legs and feet olive-brown.

Distribution. In our area :—Only found in the hills from *3,100 ft.*, where Stevens secured it below Gangtok, up to *11,000 ft.* in Sikkim. Stevens found it at *10,000 ft* at Tonglu in *January*.

Outside our area :—Himalayas from Kangra to Assam, North of the Brahmaputra River *(Stuart Baker)*.

Habits :—The habits of most of the Nuthatches are the same, most of them are arboreal, but some haunt rocks. This species is strictly arboreal. They may be found either singly or in small parties running up and down and round the trunks and branches of trees with the greatest of ease, hunting assiduously for insects in the bark ; they are equally at ease in any position and hunt up to the very tops of trees and then fly off to some neighbouring one. They feed on insects, larvæ and nuts, boring holes in the latter and

extracting the kernels. They are also said to sometimes feed on fruit and seeds. Their note has been described as like the cheep of a mouse.

Stuart Baker writes that they breed from "5,000 feet to at least 11,000". The breeding season is from the end of March or beginning of April to probably towards the end of that month. Thomson recorded from May to June but other observers have only found young birds towards the end of April and in May. With regard to the nest Stuart Baker writes :—"The eggs are laid in some natural hollow in a tree or stump, the entrance being filled in mostly with mud so as to leave only a small, quite circular entrance, little over an inch in diameter. The nest is a pad of moss, or moss and moss roots with a depression in the centre for the eggs. These number from four to six and are white with numerous speeks and spots of reddish, sometimes more sparse and confined to the larger end." They measure ·72 × ·55 inches.

2. The Cinnamon-bellied Nuthatch.

Sitta castanea cinnamoventris Blyth.

(On left of coloured plate, partly seen).

Field Identification : – Similar to the last species but with no white on the tail and much deeper coloured below. Found from the plains up to *5,600 ft.*

Description :—Length about 6 inches ; wing 3·15 inches ; tail 1·6 inches.

Male :—Upper plumage slaty-blue, a black band from the nostrils to the shoulders ; in front of the eye, cheeks, ear-coverts and chin white delicately barred with brown ; central tail feathers like the back, the others black with white patches of white near the tips ; lower plumage chestnut-brown ; under tail-coverts ashy-grey fringed with chestnut.

Female :—Only differs from the male in being a dull pale chestnut below.

Iris red-brown, bill slaty blue, black at tip, base and lower mandible paler ; legs and feet plumbeous.

Distribution. In our area :—From plains level *300 ft*, in the Duars up to *5,600 ft.* in the hills.

Outside our area :—" Nepal and Eastern Himalayas to Assam " (*Whistler*). This distribution of course includes our area.

Habits.—We found it common in the Northern half of the Duars. The habits are similar to those of the last species but also, according to Baker, it may be seen on " walls, cliffs and banks." It will also descend to the ground, which the White-tailed Nuthatch apparently never does. They breed in various positions. In the Khasia Hills Stuart Baker found the majority " built in the retaining walls of roads or in walls of fields and compounds." In these they selected " some hollow, generally only a few inches from the ground." In North Cachar he found them breeding in trees and Gammie took a nest in Sikkim in a soft decaying bamboo. O'Donel found it breeding in April and May, in white siris trees in his garden at Hasimara, the holes were from eight to twelve feet from the ground, Gammie's nest was found at 2000 feet and the hole was about 20 feet from the ground and just below an internode of the bamboo and the birds had filled up the space to within a few inches of the entrance-hole with alternate layers of green moss and pieces of tree-bark ; on the top of all was a pad of moss, fur etc. Where found in walls etc., the entrance to the hollow is filled up with mud leaving only a small circular hole. Stuart Baker remarks that " they are very persistent little birds, and will often repair and again lay in a nest which has been pillaged." Eggs may be found as early as March or as late as June. They lay from four to

eight eggs, six being the normal number which are white speckled with red and measure about ·78 × ·55 inches.

3. The Beautiful Nuthatch.

Sitta formosa Blyth.

Field identification:—A largish Nuthatch black above streaked with cobalt and azure-blue, and the underparts dull chestnut. A rare and very local bird seen in pairs or parties hunting the bark of forest trees for insects.

Description:—Length 7½ inches, wing 4 inches tail 2¼ inches.

Upper plumage black streaked with cobalt-blue on the head and azure-blue on the back; lower back and rump verdigris-blue. The sides of the head, round the eye and the chin fulvous-white, central tail-feathers blue and black, the others black edged with blue, several of the outer ones tipped with white. The lower plumage is dull chestnut. Sexes alike.

"Iris dark brown; bill black; legs greenish-horny; with yellow soles" *(Jerdon)*.

Distribution:—*In our area.* Only found in the hills from *1,100 feet*, where Meinertzhagen found it at Rangpo in Sikkim, upwards. We can find no record as how much higher than *8,000 feet* this species ascends.

Outside our area:—Eastwards of Sikkim "to the Miri and Abor Hills in Eastern Assam. Also hill-ranges in South Assam as far East as Lakhimpur. The Salween-Mekong watershed in the N. E. Shan States." *(Stuart Baker.)*

Habits:—Neither Stevens, Shaw nor ourselves have been fortunate enough to come across this beautiful Nuthatch. Tickell obtained one in Darjeeling Station itself and Jerdon one somewhere in the district. Mandelli's collectors procured a number of specimens in Sikkim both in summer and winter

and of recent years Meinertzhagen was fortunate enough to secure it in December 1925. We quote his note in the *Ibis, 1927 p. 411*:—" We were fortunate in finding this species at two places Rangpo (1100 feet) on 26.xii and at Rangiroon (Darjeeling District, 6400 feet) on 30.xii. In the life of an ornithologist there are some moments which are for ever remembered. Such an one was when we first saw this beautiful Nuthatch at quite close quarters on a dead tree hammering away at some dead wood like a Woodpecker. I was so close that to shoot would have ruined him as a specimen. As he moved round the tree I followed him, until becoming suspicious he flew off some fifty yards in open forest. On again coming up with him he had been joined by his mate. After watching them exploring the tree for many minutes, I reluctantly pulled the trigger. The female flew off uttering a typical Nuthatch call, though less harsh than that of the European bird. " We also quote Stuart Baker's notes in the *Fauna* of *British India Birds*." The Beautiful Nuthatch, well named for its lovely colouring seems to be a rare bird everywhere. I never saw it but in pairs or in family parties after the young had hatched, and it is the most shy and elusive of all the Nuthatches found in Assam. Its actions when on trees, rather slow and deliberate for this genus, reminded one of Woodpeckers and its note different from all other Nuthatches in its low, rather sweet tone. On the wing it was exceptionally swift, and its beauty when the sun caught it in flight could only be likened to that of the Ruddy Kingfisher under similar circumstances." The same naturalist writes about its nidification as follows:—" The few nests found by me in the Khasia and North Cachar Hills were all on the highest ranges from 5,000 feet upwards. They were placed in trees at considerable heights from the ground and contained from four to six eggs or young. The eggs only vary from those of *Sitta c. cinnamoventris* in being larger and broader ovals." They measure about ·80 × ·60 inches.

4. The Himalayan Velvet-fronted Nuthatch.

Sitta frontalis corallina Hodgson.

(Top of coloured plate.)

Field identification :—This Nuthatch is easily recognised by its blue colour above, ashy-brown colour below and bright coral-red bill in adult. Usually seen in parties hunting forest trees from the plains up to *3,800 feet* in the hills.

Description :—Length about 4·9 inches, wing 2·9 inches tail 1·5 inches.

Male :—Upper plumage purplish-blue ; a broad band on the forehead and a long eye-brow black, ear-coverts lilac. Chin and throat white and lower plumage ashy-brown suffused with lilac.

Female :—Similar to male but without the black eye-brow and slightly smaller.

Iris yellow : orbital skin lemon-yellow ; bill bright coral-red ; legs and feet pinkish-brown.

Distribution :—*In our area*.—Found in the Duars as low as *300 feet* and up to *3,800 feet* in the hills. Himalayan birds are smaller than the typical race *Sitta f. frontalis*.

Outside our area :—" The small Himalayan form extends through Burma to Java." *(Whistler.)*

Habits :—A common resident bird in the forests of the Duars and generally seen in small parties of six or even more hunting the bark of trees assiduously for insects and larvæ. They are often found in the company of other small birds. It is the most active of the Nuthatches. Baker describes its note as a " mouse-like cheep." It does not ascend the hills above *3,800 feet* and is commoner in the plains area. It is resident whenever found. The nesting season is in April

and May, Mandelli took a nest in Sikkim on the 4th May. It was placed in the hollow of a trunk of a large tree and about three feet from the ground. The nest was composed of fine moss felted together with some fine vegetable fibre and on the top was a layer of short silky fur, probably that of a rat. Stuart Baker writes :—"It selects some natural hollow or one made and deserted by a Barbet or Woodpecker. Though it very seldom uses clay to reduce the size of the entrance, it does, on the other hand, often enlarge crevices sufficiently to allow it to make its nest in some enviable hollow. The nest itself is made of moss, generally green and fresh, worked into a solid pad, and above this may be fur, fur and feathers or, very rarely, feathers alone. This lining or superstructure is always soft and plentiful, almost hiding the eggs which number from three to six. They are typical Nuthatches' eggs, but are rather more densely and uniformly covered with blotches than is usual and they are also longer ovals in shape than are those of most Nuthatches." They measure ·68 × ·58 inches.

Wild dogs chasing the domestic variety.

An Englishman was trying to convince a Scotch friend of the possibility of miracles, as instanced in the Bible, but without success. In order to overcome the Scotsman's apparent obstinacy in this matter he said :—"Look here, Sandy, supposing, as you were walking down the street, you saw a man jump out of a 4th floor window, fall in a heap on the pavement and then pick himself up quite unhurt and walk briskly along to his work, what would you call that ?" "I'd say the man was awfu forrtunut" replied Sandy. "Right," said his friend " and now supposing the very next day you saw the same man do the very same thing with exactly the same results, what would you call that ?" "A verra remarkable coeencidence" said Sandy. Now the Englishman asked "supposing you saw the same man do it again the next day with like results, what would you call it then ?" "Man", said Sandy, "I would na be fashed fer I'd ken fine t'was the man's regular habit."

Having personally witnessed the Wild dog chasing its domestic compeer, on no less than four occasions, I am forced to the conclusion that it is no more than its regular habit. Thinking, however, that a short account of these incidents may interest some of our readers and induce any who have had similar experiences to relate them and give their views as to the probable incentive actuating the Wild dog, I append the following note.

The first occasion on which one of my dogs was chased was in 1928, I was then employed on a Rubber Estate in Travancore and the occurrence took place in February. Owing to the dry weather prevailing at that time of the year forest fires were of common occurrence. To protect the estate from damage by fire all boundaries adjoining forest land had been cut and cleared. I was inspecting the work one forenoon accompanied by an Airedale bitch,

At a certain point she became excited and dashed into the jungle, which consisted of dense *Eta* (a small species of bamboo) and bayed loudly. I was unarmed so it was futile to try and follow her. After a few seconds she was silent and I heard a sound which I, at first, concluded was made by a very young wild pig, from which, indeed, it was not dissimilar. Shortly after my dog dashed out, of course, towards me, followed by two Wild dogs. These made at her from either flank and the one on the side nearest me passed by me within three feet of where I stood. My dog dashed into a dry nullah some few yards away and then, evidently, decided that, as all the odds, numbers, speed, armaments and science were against her, her only hope was to surrender. She therefore rolled over on her back, doubtless prayed hard, and looked "Camarad" in every line of her body. The Wild dogs stood over her and looked closely at her as much as to say, and perhaps rightly, "coward". While they were scrutinizing her thus I heard the whistle-like call of young pups, and two, standing about 6" at the shoulder, came out of the *Eta*. The parents promptly left their prisoner and walked back to the pups which disappeared into the jungle. When returning one passed at a walk within ten feet of me and took not the slightest notice of my presence. While the incident takes some time to write about I fancy that not more a minute and a half elapsed from the time that my dog started to bay to the completion of her sigh of relief at finding herself alive and free.

Though of passing interest, there is nothing strange in this incident as we can naturally presume that the Wild dogs were prompted to act as they did, by the very strong instinct, inherrant in all animals, to protect their young from danger.

The next occurence happened on the same estate some time later. I was walking through the main block of

rubber at about 2 p. m. one day and with me were a male Airedale and a Pie bitch. These suddenly got on to a scent and dashed down through the rubber and were soon out of sight. Shortly after the Airedale bayed and then there was silence except for the patter of the pie dog's feet as she legged it uphill towards me. A few seconds later the Airedale came in sight, also all out in top gear with three Wild dogs alongside of him. While chasing him they gave vent to their peculiar sharp staccato call, uttered apparently under excitement and comparable to giving tongue in the domestic dog. At some distance it sounds not unlike the clicking of castanets but when heard at close quarters it is a disyllabic sound perhaps best described by the words *wink-weuh*. The Airedale got back to me fairly blown, his pursuers stopping about ten yards away. They gazed at us for some seconds and then trotted calmly back in the direction from which they had come.

In this case it must be admitted that they did not go out of their way to chase the dogs but that when the dogs attempted to do so, they soon turned the tables on them.

That they deliberately refrained from coming to grips is also certain, as from the time the Airedale came in sight they were almost touching him. The three were part of a pack of nineteen dogs, as I was able to count them as they crossed a bare hillside about half an hour later.

The third instance occurred on the Nilgiris where I am, at present, residing and happened about four months ago while I was returning, on horseback, from the Coffee Estate I am working, to my bungalow. The road passes through a thick *shola* covering a steep slope and in the *shola* zigs sharp back and forward across the hillside. On this occasion I had a Bull terrier and a Wire-haired bitch with me. Riding through this *shola* I noticed a reddish animal, that I thought was a Barking-deer, disappear into

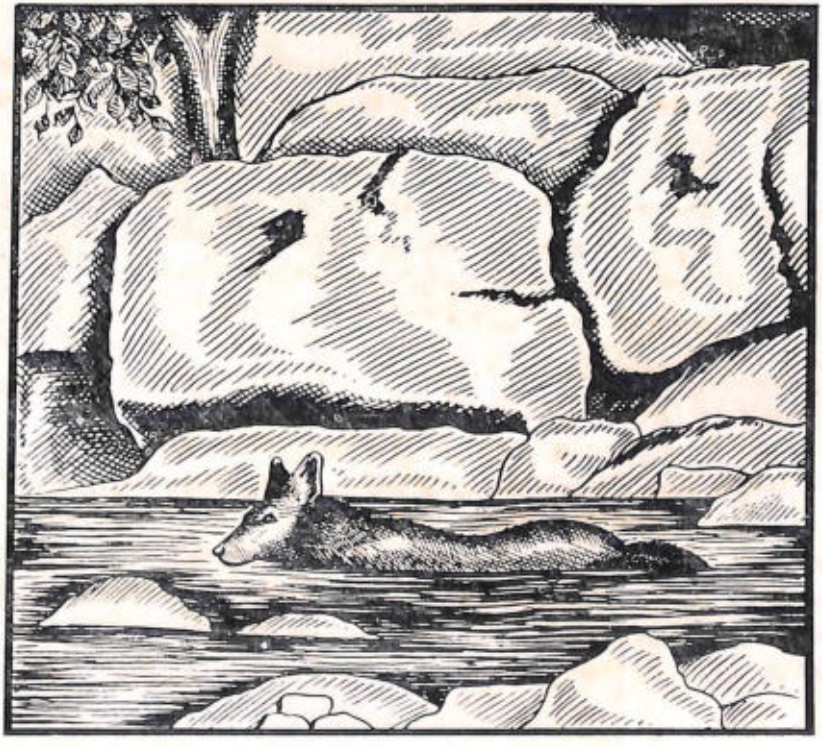
the undergrowth at the corner of the zig ahead of me. The Bull terrier saw it too and went into the jungle after it while the other dog followed unconcernedly some distance behind me. I had passed the point and was nearing the next bend when I heard the click-like sound of the Wild dog. Looking back I saw the Bull terrier dashing towards me and the Wild dog coming on to the road not far behind, between me and the Wire-haired bitch. The Wild dog spotted her and promptly gave chase. Thinking to elude her pursuer she slipped off the road into the undergrowth and jinked and doubled in a manner that would have raised envy in the heart of an active hare. Finding this of no avail she took to the road again and made for me, closely attended, or I might say, overshadowed by her wild friend. During the whole chase the Wild dog kept giving tongue at short intervals. The terrier having reached my horse's heels the Wild dog stopped a few yards off, looked hard at us, and turning about, trotted slowly away.

Here again the Wild dog deliberately refrained from using his or her teeth which it could often have easily done during the chase. One can but presume that curiosity was the main inducement in the matter. Be that as it may, the terrier is undoubtedly firmly convinced that Wild dogs are *not* nice to know and thinks her own turn of speed and jinking powers were not too bad under the circumstances.

The last occurence took place in the very same locality three months later and at much the same time in the evening. I heard a rustle in the jungle above the road a caught a glimpse of a Wild dog disappearing. The same Bull terrier and Wire-haired terrier bitches were with me and the former, hearing the sound, dashed into the jungle to investigate. She was away perhaps a couple of minutes and soon after she rejoined me I heard the call of a Wild dog. As, from the sound, it appeared to be approaching I stopped and



We were able to have a real good look at each other.



"He made for a small pool and lay in it with his body half immersed."

watched the road immediately below me. Presently *Cuon* came trotting along eagerly scanning the road ahead for a sight of the dog; suddenly some sixth sense warned him of my presence and he looked straight up at me. We looked at each other for some seconds and then I raised my hand when instantly he dashed down the road but stopped after a few yards and looked back over his shoulder. I rode on, both dogs keeping, what they presumably considered, a safe distance of about ten yards, ahead of me. The Wild dog continued to call and it was obvious that he was following. Stopping again I had not long to wait before his head and shoulders appeared round a bend in the road, some thirty yards behind me. He stopped and we admired each other, that is presuming he saw anything admirable in me. I rode on and he followed keeping about thirty yards behind. Familiarity, as usual, bred contempt and he reduced the distance till there was often not more than twelve yards, if as much, separating us, I stopped several times while he was following closely and we were able to have a good look at each other. He was a male, in the pink of condition, the sun making his flanks shine like a well-kept horse. He appeared to be feeling the heat as his mouth was partly open most of the time. Once or twice he seemed to comtemplate leaving the road and getting ahead of me by way of the jungle, but changed his mind, probably thinking it too risky. My dogs frequently looked back but seemed to have no desire to come in closer contact with their wild cousin. He continued to follow, frequently calling, till we came to a stream between the jungle and a Coffee Estate, beyond which he evidently decided it was dangerous to go. He made for a small pool and lay in it with his body half immersed and at the same time had a good drink, lapping up the water noisely. After an apparently enjoyable bath he left the water, stood and shook himself vigorously, and looked alternately at the dogs and toward the direction from which he had come. While he stood thus, some fifteen yards away, deciding on

his next move, his ears kept moving continuously straining to detect sounds discernable to such very microphones. After half a minute or so he made up his mind to go back the way he had come and, after a final look in my direction, he walked back and was soon out of sight. The distance he had followed the dogs was a little over six furlongs and I have little doubt that only the proximity of human habitations prevented him from following further.

At the time of this occurence the Bull terrier bitch was coming in season so that sexual attraction, very one sided it is true, was no doubt the reason for this Wild dogs' behaviour.

From these incidents I have been forced to the conclusion that the Wild dog has little fear of the domestic variety and not very much more of man. That their chasing the domestic dog is more in play than anger and that they have no desire to come to grips, though should the domestic dog start fighting, I have little doubt the wild one would prove much more than a match for it. That a dog who lives by his fangs must perforce thoroughly understand his powers of attack and defence and be able to judge his opponents strength or weakness is probable. In this case it would be obvious to such that in the domestic dog he has little to fear. A pack of hounds would, no doubt, be given a wide berth but any one or two ordinary dogs are looked on more or less with contempt and if they run from the Wild dog are promptly chased. It also seems possible that in suitable circumstances and environments sexual intercourse might take place between the two varieties.

A planter on these hills states that, on his Estate where Wild dogs are fairly common, his coolies have been chased and treed by a pack on more than one occasion. I fear, in this belief, he shows no great knowledge of the South Indian coolie and still less of the character of the

Wild dog. That a coolie managed to climb up a tree and that the dogs came and stood underneath for some time looking up at this quaint ape-like human or almost human ape as probably they thought him, I don't doubt, but of chase there can be no question. The Wild dog is a sprinter and over a short distance has, for all his rather awkward appearance, a remarkable turn of speed. If anything like a chase took place the most agile coolie, even with the additional speed induced by fear, wouldn't stand a chance over anything even like a hundred yards. Probably what happened in such cases was that the coolie seeing a Wild dog or two made for the nearest tree, possibly only a few feet away, and got up it. Curiosity, which is a marked characteristic of the Wild dog, promptly induced it to examine the coolie from near the base of the tree and having come to the conclusion that he was an ugly looking piece of work, not worth wasting good hunting time over, trotted away to look for a suitable quarry.

The process of evolution has no doubt accentuated such characteristics in *Cuon* as best to enable it to survive and hold its own. The most marked are an extraordinary knowledge of the value of combination and team work. No animal carries out the principle expressed in Kipling's words. "The strength of the pack is the Wolf and the strength of the Wolf is the pack," with greater force than the Wild dog and this team spirit has no doubt increased his agressive tendencies. Curiosity, of which he possesses ample measure, combined with this Nazi-like agressiveness, no doubt causes him to chase the domestic dog, as already described and also, possibly, the human being on occasions. I, therefore, conclude it is not surprising that such incidents occur as have been described and would be much interested to learn if some of my readers have experienced similar behaviour on the part of the Wild dog and to what they

attribute such. A Shikari friend whose opinion I asked, who looks on *Cuon* as a poacher of the worst type, said he had never had a similar experience and added "it is only congenital cussedness on the part of the rotten beast," perhaps he is right.

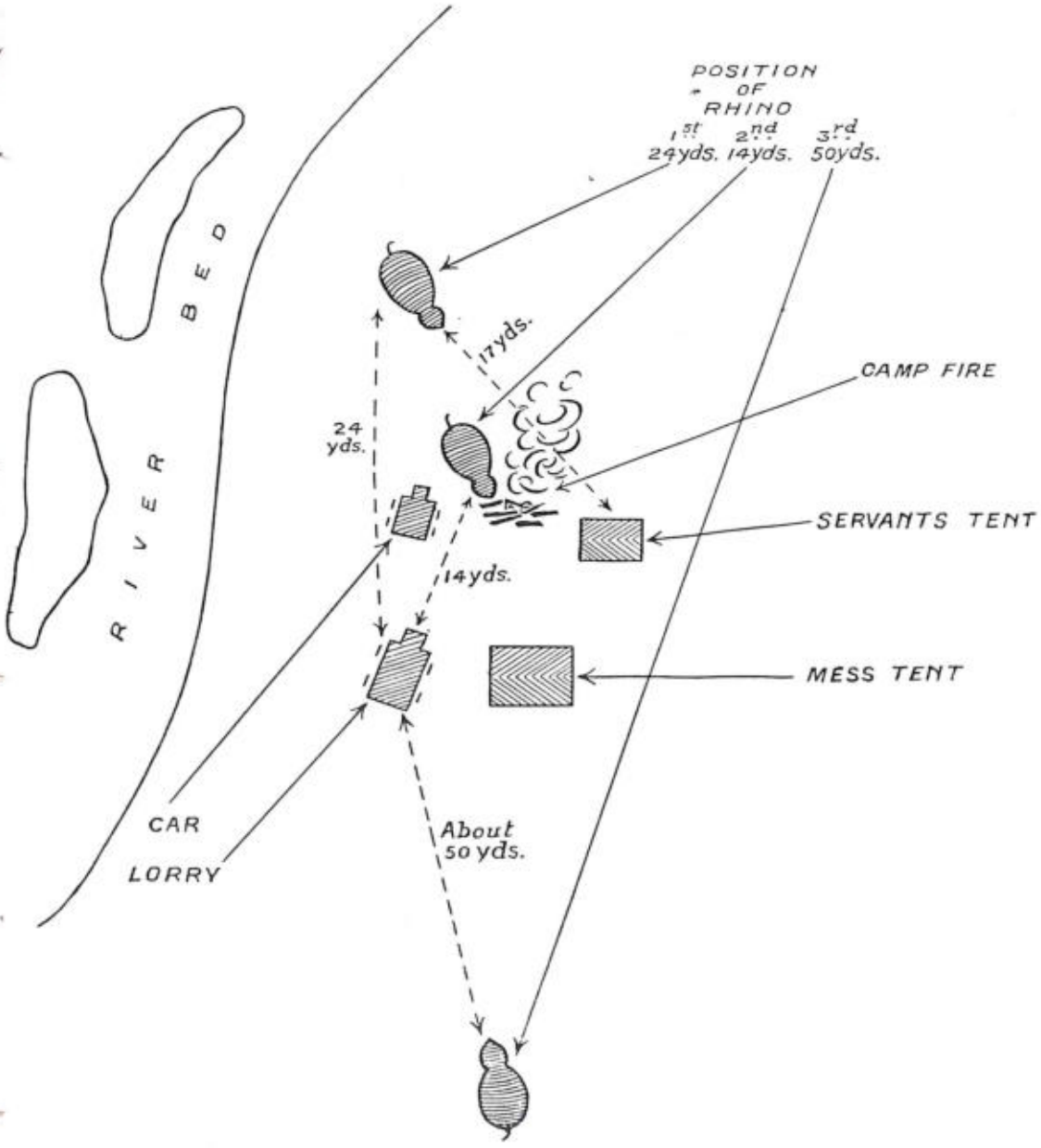
C. P.

An Inquisitive Rhino.

While camping out during one cold weather on the banks of a well-known river in the Dooars, I, and two friends, had the fortune (at the time we thought otherwise—being in pyjamas and suffering from extremly cold feet) of being in the closest proximity to a very fine Rhino for a matter of two and a half hours in brilliant moon light. As it is an experience one is hardly likely to meet again under like circumstances I thought it perhaps worth while recording.

Our first night in camp, after a good dinner and the usual quoto of chota pegs, we retired to rest at about 10 P.M. As Rhino tracks were quite fresh in the vicinity the precaution was taken of sleeping in our lorry rather that in our more comfortable tent, so we transferred our bedding and there was just room for three of us lying crossways without knees tucked up. At 1 A.M. I awoke at the sound of heavy trampling in the jungle quite near, and saw one of my friends quietly looking out at the back of the lorry. I at once asked him "what is it—Sambhur?" he replied "No—Rhino." Neither of us spoke again but got out rifles, which we had beside our beds, and crawled to the back of the lorry and gradually took up a standing position covering the Rhino. He was a magnificient sight standing in the moonlight, twenty four yards away, taking stock of his surroundings and apparently unaware of our presence. He

AN INQUISITIVE RHINO



stood in this position for about half an hour, pricking his ears from time to time in all directions. Imagining that at any moment he would charge, on scenting us or our servants, (who were housed in a shake-down seventeen yards from him), we kept him covered the whole time. After about half an hour of this I unfortunately tramped on the face of our other companion, who was fast asleep; we had been standing over him. He awoke with a roar and charged to the other end of the lorry for his rifle, the commotion causing the Rhino to turn in his tracks and disappear. The road apparantly being cleared I thought it best to get my heavy rifle from our tent, (we had been covering him with Winchesters and soft nosed bullets) and within five minutes the Rhino was back again, this time coming much closer; the fire, which by now had died out, pulling him up. He couldn't make out what it was and scraped in amongst it with his toes, and blew great clouds of wood ash all over the camp. Our servants, now wide awake, were all huddled together at the entrance to their tent intently watching the Rhino who was only nine yards from them, and one of my Shikaris had the greatest difficulty in keeping my fox-terrier quiet; he had him buried under blankets and had all he could do to keep him from going for the Rhino. Luckily the servants kept their heads and sat still, otherwise I'm afraid some of them would have been a sorry mess. Only the thoughts of an enraged forest officer constrained me from dropping the monster! several times I carefully beaded him and all but fired—a perfect neck shot at 14 yards, my first Rhino, I thought! but it was not to be. During this time the whole thought of one of my companions was for his car, for which the insurance policy had lapsed as the Rhino would certainly have made match wood of it had he tried conclusions. The Rhino did not appear to be at all in a hurry to leave and kept us standing, at his pleasure, for upwards of an hour. He at last sauntered off the way he had come, walked round the camp and took up

another position, about 50 yards off, in the jungle and kept the camp in view. It now being 3-30 A.M., and all hopes of sleep gone we had tea, the Rhino fading away as the noise of the camp increased. He appeared to be apparently quite unaware of our presence the whole time he visited us, and was a magnificient sight in the full moonlight. With nothing further to do until day break I sketched the camp and we measured the different positions he had taken up.

Since this introduction I have met Rhino (once two) on five different occasions while out shooting with a single elephant and have come to the conclusion that they are quite harmless if not molested. On each occasion they have shown a keen interest on being disturbed, but toddled off once the elephant became impatient.

J. A.

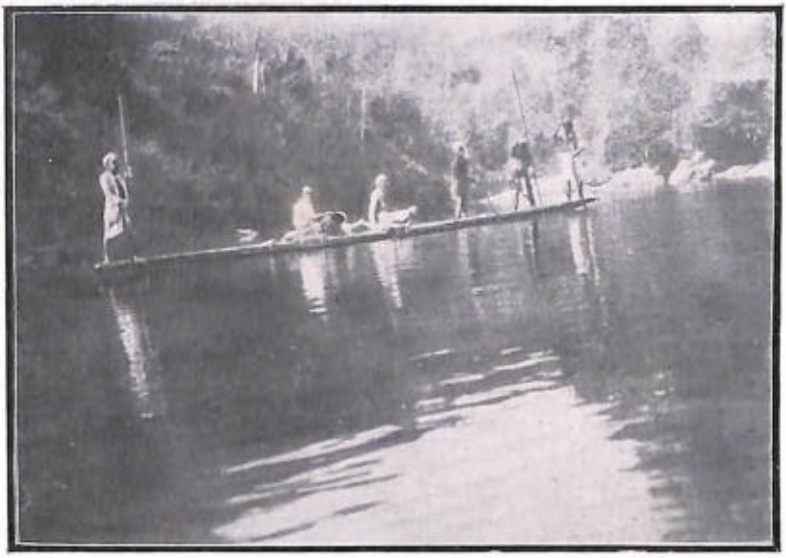
Fishing in India and in Europe

BY

COLONEL H. S. WOOD, I.M.S.

(With two half-tone plates.)

For many years, in India, I did not fish and, afterwards, when I did take it up I regretted the time and opportunities that I had lost. My advice, therefore, to all who go out to India, is to take up fishing. In conjunction with shooting it is a splendid hobby. Of Assam it may truly be said that where there is good shooting there is good fishing and *vice versa*. After a hard day's shooting it is very pleasant to take the rod "out for a walk" along the banks of some lovely river and to secure a change in sport and in one's diet. I have known people suffering from a nervous breakdown recover when they took up fishing and one can



OFF FOR A DAYS FISHING ON THE DEHINGI.



RIVER SCENERY ON THE DEHINGI.



RIVER SCENERY ON THE DEHINGI.



RIVER SCENERY ON THE DEHINGI.

go on fishing until you are well in the seventies or eighties. It is not only the fish that interest one, there are birds, animals, butterflies and other insects to observe, as one goes along, and to the fisherman the pools and rapids of some beautiful river are a real joy; the noise and purling of the waters are music to his ears. What delightful memories come back of those days spent on some splendid river in Assam at the end of the rains when the cold weather is setting in!!

As a general rule where you get good Mahseer fishing the scenery is grand; great stretches of green deep pools; rushing rapids; cliffs, with ferns and other exotics, rising abruptly from the river on one side, and the forest coming right down to the water's edge on the other. Beautiful stretches of sand and shingle in parts and the forest full of all kinds of game, howling monkeys the *tuk tuk* of the Great Hornbill and various other jungle cries. While going along one sees Barking deer, peafowl, pheasants, Sambhur, otters, monitor lizards, Imperial pigeon, Bar tailed Cuckoo doves and "greeners." With luck a Tiger or a Bison may be also seen. I, myself, have seen Elephant while fishing and many men in Assam have seen Buffalo and Bison. It is always a good plan to take one's gun and rifle when out fishing as on the Assam rivers one never knows what one may come across. Then too there are Gharials to shoot also duck and teal. Some of the rivers in Assam, especially the Kopli and Doyang harbour flocks of cormorants, and otters are very numerous. These, no doubt, do a great deal of harm and need keeping down. On the Kopli I once counted a school of fourteen otters. They were amusing little beggars to watch. They came out of the water, played, rolled and scampered on the bank, chasing one another, rolling over and uttering snarls and squeally noises. Every now and then one would stand up on its hind legs and investigate, much in the same way as a rabbit does.

Otters are very wasteful, they only eat part of a fish and leave the major portion. I think they enjoy the sport of catching fish as much as the eating. They make delightful pets if secured young; follow one about like a dog, but when they grow up get savage and are inclined to bite strangers at feeding time.

I was first initiated into the mysteries of fishing by a brother officer. Our cholera camp was situated on the banks of the lovely Chungai river in Manipur, about 12 miles to the north-east of the city. My C. O. was a keen fisherman and one of the best. One day he said to me "Doc, why do you not take up fishing?" I said "I know nothing about it" and he said he would teach me. He took infinite pains with me and initiated me into the mysteries of tying fishing knots, names of flies, baits, etc., and gave me lessons on throwing a fly and casting. My first attempts were disastrous; my casts got hopelessly knotted up and many many times I had to climb trees to free my cast and many times my flies went off with a flick amidst much cursing and swearing. However with perseverance and patience, which every fisherman must have, I got to throw a line fairly well and to cast. My C. O. set me up with an 8 ft. Green heart and tackle and, after a time, I and H, a subaltern, used to go out for the whole day and bring back game and any amount of fish.

I never regretted having taken up fishing and in after years when I went into Civil I had grand opportunities for following this sport. I remember one day H. and I lost our way, through the ignorance of a Naga who was with us; as we were returning to camp a terrible thunderstorm came on and we could only make and see our way by the flashes of lightning. We stumbled many times and staggered into camp at 3 A.M. absolutely dead tired. Our C. O. was very concerned about us as one of our men had been killed by a

Naga, while up the river, a few weeks before. The C. O. sent word to us to go to his hut and we returned word that we were exhausted and would be present in Orderly room at 7-30 next day. He gave us a dressing down and we expressed our regrets.

The Chungai river swarmed with "Booka" Mahseer and Baril but there were very few *Barbus tor*. The "Booka" ran to about 2 lbs. maximum and took the silver fly-spoon well. I also caught them with acorns and a small fig-like berry. The Baril cooked like whitebait were very good. At that camp we practically lived on game and fish. There was no work to do, so for six months we had a very nice holiday and got very fit, but if I had remained there much longer I should have forgotton all my professional knowledge and skill. H and I lived in a grass hut, each of us had a camp bed and a deal box, on end, served as a table. The floor was clay and our fireplace was a hole scooped in the ground, lined with stones and "leeped" with clay. We used to ride into Manipur once a fortnight to get cigarettes and other necessaries. It was, indeed, a very happy and simple life.

Our C. O. had a half savage Abor as his assistant bearer, who we all thoroughly detested. When the C. O. gave him a hiding he took revenge by burning his master's things ; on one occasion he burnt the mosquito curtains and the C. O. had to go without one for the rest of the time. When we returned to Manipur, as he was very miserable, the Political Agent said he must be sent back to his country. He was put in-charge of some cartmen and went to sleep under a cart and got crushed to death when the cart was being loaded up.

Our camp was a pattern of cleanliness, order and sanitation. At that time there was famine in Manipur, rice selling at eleven rupees a maund so hosts of Manipuris

went to the Naga Hills. Our C. O. had an order that everybody who passed through our camp had to do some work so we had plenty of free labour. One day a party was passing through, accompanied by a "doolie"; of course all the men were put on to do their quota of work. My C. O. enquired who was in the "doolie" and when we peeped in we saw rather a good looking Manipuri woman. The C. O. asked who she was and was told that she belonged to the Padre Sahib's entourage and that he was coming along behind. The Padre turned out to be an American Missionary on his way to the hills. He was very angry that his men etc., had been detained but our C. O. settled him and wished he could have put him on to some manual work. The woman was his bearer's wife? I have an antipathy to missionaries working amongst the splendid hill tribes; under Christianising influences they become lazy and degenerate and lose all respect for themselves. They discard their handsome national dress and dress themselves in some European costume looking awful guys.

When I left Military I was fortunately posted to Sylhet. In this district Ommaney, mentioned in Thomas' "Rod in India," made his fabulous bags of Mahseer. I soon found out the best places, they were the Ponatite at the N. W. corner of the district where the river debouched into the plains through a lovely gorge in the Sunamgunj sub-division. I shall never forget my amazement when I first gazed on this fisherman's paradise. There was a huge pool, several hundred yards long, now and then I saw the red fin of a Mahseer protrude above the water and the Chilwa scuttled along the water when one of those fish rushed for them. Here is luck I said but I was bound to disappointment. Shortly before leaving the regiment I bought a lot of second-hand tackle from one of the subalterns. He had never looked after it nor did I take the trouble to examine it carefully before I set out; the

consequence was that after each mighty rush traces and line gave way and I lost all my fish and most of my spoons. I threw away the remainder of that tackle and ordered a new lot from Hardy, Manton and Luscombe. On my next visit to this place I got some nice fish and secured a Goonch *(Bagarius bagarius)* of 67 pounds with which I had great fun. I hooked him at the head of a rapid (I was using a No. 10 G. & S. spoon.) He went off with a tremendous rush down to a big pool below and I followed hard in my dugout but when near the spot where he halted he rushed no more but bored down into the depths of the pool and there remained still I could not shift him and my line felt as if there was a stone on the end of it. My Khasia boatman swam to the bank and brought a lot of large stones in another boat and threw them into the water alongside my line. This shifted the fish and I got on to the bank and tried to play him, but do all I could I couldn't reel him in and he lay tossing on the surface. My Khasia took a pronged spear, swam out and brought him in. What an ugly brute he was, piebald with a very large mouth full of powerful teeth. On his head were plates of the nature of "shagneer", very rough and a horny spine, also rough, on the front of the dorsal fin. The native name for it is *Bag-mas*.

This Ponatite was a fascinating place. In the higher reaches the cliffs rose abruptly from the water's edge and the rocks assumed all sorts of fantastic shapes. On some of them I noticed writings in Urdu and visited a wonderful cave full of bats. The higher reaches are difficult for boats as there are rapids up which a dug-out cannot pass. There is also no path along the edge to reach the pools beyond, a folding boat is of no use, so the Mahseer is safe in those higher pools. Hard by the Ponatite is the Tangour Haor which, at one time, swarmed with Sambhur, Hog-deer, Pig, Buffalo and Tiger, but like all places in India the game has

been decimated by Zemindars and slaughter during heavy floods. Close to the Tangour an old Mohammedan called Toota Meah-Sahib lived, a fine old Mohammedan gentleman of the old school, with a long flowing henna-stained beard. He used to accompany me on my fishing and shooting expeditions. He had a great reputation as a tiger slayer; he never used a gun but during the floods when the Tiger got stranded on fairly dry floating islands, he used to push his long boat into the reeds and spear the Tiger. One day a Tiger got home and mauled him on the neck and after this his head jerked from side to side, evidently due to injury to his musculo-spinal nerve. He was a nice old man. The first time I bagged a Buffalo with him he jumped on to the carcase and shouted "*Shabash-Sahib.*" He died before I left Sylhet. Would that India held many like him! When he accompanied me in boats he always had his pet Bald-headed Coots in large cages with him. These Coots made a loud noise like a drum the Bengalis call them "Seem-Kookra." [We have never heard this name applied to any of the Coots or Moorhens, the Paharias apply it to the Woodcock and we have, on occasions, heard Snipe called so by them. We wonder whether Col. Wood refers to the Water-cock or Kora (*Gallicrex cinerea*). It is kept by the natives of Sylhet and Cachar on account of its fighting propensities which are probably greater than those of any of the other water-fowl, the males, as Stuart Baker says, "fighting desperately through the breeding season challenging one another with a loud booming call, several notes uttered in quick succession and finishing with a much shriller one rising almost to a scream." *Editor.*] They have very long claws and the tame ones fight with the wild ones and hold tight until the trapper comes up and seizes both. When walking the Coots flick their tails in a cheeky sort of way after the manner of all Coots and Rails.

The worst of the Ponatite was that it had a bad reputation for malaria and I got one good dose of it. The heaviest

Mahseer I got here was 23 lbs., but had my tackle been good, in the first instance, I am sure I would have landed a 40 pounder.

The next best place was the Hurry and its tributary the Rowai, both coming from the Khasia Hills. It was easily got at from Sylhet, so I had a permanent fishing-camp made at the junction of the two rivers. Any casual leave I got in the winter months I spent there. My boss, D. C. and self used to spend the Pujah and Christmas vacations there and had a glorious time ; we were just like school boys out for a holiday. I remember once, on the upper reaches of the Rowai, we found a virgin pool where the fish had never seen a spoon and we pulled out 7 and 8 pounders as fast as we could land them and cast our spoons. Burghat, a village close to where the Hurry rushed through the gorge and towering cliffs, making a noise like Niagara, was a beautiful place with a pool nearly three quarter's of a mile long. As the rivers had been closed by Government to fishing by nets, spearing etc., for a number of years, the fishing was exceptionally good. On the hills above Burghat there was good Bison ground and I had some tremendous tramps after them. Along the Rowai were many salt licks to which Elephant, Bison, Deer and Pigeon used to come. One night on the Rowai I shot a Sambhur by moonlight and on another similar night I saw two Leopards close to the bank of river but could not get a shot. We often heard Elephant crashing in the bamboos and once they gave us a nasty time which I will recount when dealing with those pachyderms. My wife and I got 450 lbs. of fish in ten days, the largest Mahseer being 57 lbs. but he did not fight as well as some of the 16 and 23 pounders ; he was a very thick fish. One day I hooked a fish while trolling from a dug-out. I got on to the bank and he led me a dance by rushes down stream ; after a bit he made towards some snags lower down the river and I knew if he got there he would break. I shouted to my

wife to take the rod and give him the butt and to hand me the ·360 rifle which she was carrying. When his back and dorsal fin showed I fired and bagged him, it was rather a mean way of getting him. Sometimes on the banks of the Rowai we came to spots which attracted butterflies, the shimmering quivering mass exhibited the most varied kaleidoscopic effects. [We have many times seen this on damp spots on the sand banks of streams, numbers of *Appias*, *Ixias*, sometimes a Swallow-tail etc. would congregate to suck up the moisture. *Editor.*] One smallish butterfly we saw had transparent wings veined with black and from the end of the lawn-like wings a black corkscrew like tail projected.

Below Burghat there was a very dangerous rapid, where many boats had been dashed to pieces and some lives lost. It was here that, one Christmas, my wife, servants and self missed death by inches. We had been camping at Burghat and on the day we were leaving a death occurred in the village so none of the Khasia boatmen could take our boat down to our next camp. I obtained some boatmen from the manager of the Lalakhal tea garden further down the river. Unfortunately I gave them some money before starting, never dreaming that they would spend it on drink. Just as we were going to shoot the rapids, the man who was steering fell overboard and our boat swept down towards destruction: very fortunately a side current caught us and took us on to a flat rock just above the roaring rapids and there we stuck with the water pouring into the boat. We were however lucky as some men were on the bank, and, shouting for help, they came and rescued us. We saw nothing of the drunken man and presumed that he was drowned but he turned up in camp in the evening looking a miserable wreck. I felt like castegating him but considered he had had enough punishment already. Had he been sober I believe he would have drowned!!

The best stretch on the Hurry was between Burghat and the village of Pesaduar down the river; below the latter I never caught a Mahseer. After returning to camp I used to go out in the evening for Chilwa with a very light rod and cast of three very small flies, Cock o Bondhu, Black Gnat and Wickham's Fancy. .It was great fun and again and again I got a Chilwa on each fly. I once got 76 in an hour they were so numerous: cooked like Whitebait they are excellent eating. I have seen the water quite rough with them their heads sticking out above the surface of the water. They seemed to like the fish oil that floated down from the places where the women cleaned the fish for market.

After a few years I was transferred to Tezpur in the Darrang district. Here the best river was the Borelli and the shooting in that locality was excellent, Rhino, Buffalo, Bison and Bear. It was, however, rather a difficult place to get to from headquarters and on one occasion that we went there our camp was washed away and we had to retreat.

Uncle C., a tea planter, was a great fisherman and as his bungalow was practically on the Borelli I had good sport with him. On one occasion a boatman got a treble hook through the web of his fingers, C. produced a pocket knife which I sharpened on a stone and sterilized with lighted matches and cut it out, the man never winced.

On retirement I fished the Dehingi and Kopli in the North Cachar Hills. The rivers and scenery were lovely but the fishing was not a patch on what I got in the Sylhet district, mainly due to poisoning and the depredations by otters and cormorants. We used to see hundreds of dead fish floating down stream and our servants had a royal time gathering them. A good deal of damage was also done by fish traps and dams. The shooting however was excellent and we spent many weeks camping on the banks of these rivers. During our three years residence at Haflong we had

many thrilling, experiences with Tiger on these rivers and in their vicinity, these will be related hereafter. Our camps were often miles away from villages and we used to hear the wild Elephants trumpeting in the forest around us. One day three of them watched us from a little way up a wooded cliff on the opposite bank. They flapped their great ears and then moved silently away. The birds on the Dehingi were very tame, the wagtails used to come into our tent. Once while my wife was fishing from a boat with a small G and S. Spoon, a blue kingfisher made a dash at it, missed it the first time but succeeded to catch it on its second attempt. It started to fly off with it but the spoon dropped and the bird perched on the rod within six inches of my wife's hand. I tried to catch it but it flew off.

There was good Butchwa fishing in the Dehingi and I used to catch them with worm. They were excellent eating [I can corroborate this as they were our best fish in Bihar and a very sporting fish too. *Editor*] almost as good as Hilsa. It was curious that all the Mahseer in the Dehingi had yellow fins. It was a great place for Gharial. I once, wounded a monster but didn't get him ; he occupied a large deep pool and his girth was enormous. Many had tried to bag him and I expect him hide is perforated and scarred with bullet holes. We used to get Peafowl on the banks of the Kopli, one of the few places in Assam where they are still found.

I invested in a Ford folding boat to surmount the difficulty of the rapids on these rivers. It could be carried by two people but was too vulnerable owing to rock snags in the river. We once tore a hole in it and I had to paddle like blazes to get her ashore before she sank, my wife being in her at the time and unable to swim. I would not recommend such a boat but it is exasperating to come on a lovely pool above a rapid, full of good fish and no way of getting at it except by trolling from a boat. I have often climbed through the jungle and looked down from a height at the

large and small Mahseer lazily swimming about near the surface of such a pool. The banks being too steep and covered with jungle for casting one had to turn back with many regrets.

I kept careful notes of all my fishing expeditions with weighments and notes on Mahseer but unfortunately they were stolen when a despatch box went missing. The notes on Mahseer were given to me by Khasias and they know more about fish and how to catch them than any one else. I have always found them very obliging, nice and genial folk and very keen on all kinds of sport. They are a very virile race, when not touched by education and the missionary. The women are good looking when young but soon grow haggard from hard work. They do practically all the work while the men fish and hunt but many of the women can fish and handle a boat as well as any man. I have never, however, seen them use a spear. I once saw an old hag haul out garfish one after the other. She was armed with a stick and line with a hook on it baited with a small broadish fish. She trailed and drew the bait over the surface of the water ; the garfish grabbed it and before it had time to loesen its teeth she had whipped it into the boat. She seemed to land one every three minutes and her boat was full of them. The women also use the flying ant as a fly and can cast with great precision. It is sad that the Khasia, like many other Eastern people, regards his wife as a beast of burden. When he marries he doesn't seek out a pretty face but chooses a girl with a broad back and big calves. They are capable of carrying as much as 80 lbs. up very steep paths. The Khasias houses are very dirty as pigs, fowls and pigeons are kept in the dwelling room and they swarm with ticks. When camping it is advisable to keep well away from their villages on account of the stench emanating from drying fish, swarms of flies and numerous dogs. Leprosy is very prevalent amongst these people.

The Khasias use two kinds of boats for fishing one is the ordinary dug-out and the other a real boat, made of *Jharal* wood and very light and strong, It draws very little water and the stern has a projection forming a platform on which a man can stand to pole or paddle. It is astonishing the number of knocks and bangs from rocks that these boats can stand. Four men can easily carry one of these boats. Two men punt the boat up stream and when coming down stream or shooting rapids one steers with a paddle in the stern and the man in front keeps the boat off the rocks with a bamboo. The Khasias are expert swimmers and recover with great skill spoons and lines that have stuck in snags and rocks. In doing so they make a ring with the fore finger and thumb round the line and using this as a guide they dive and release the spoon.

The Khasias have many ways of securing fish ; 1. Netting ; 2. Using rod and line. 3. Poisoning ; 4. Spearing ; 5. Trapping ; 6. Casting, with a very long rod, a hook baited with a dead fish. For poisoning they use the pounded bark of a tree which has a red appearance. They dam a pool and them poison it the fish get stupified and rise to the surface of the water. This is a very wasteful method as many of the fish float down the river and are lost.

Spearing.—They use two kinds of spears and are very dexterous with both. One has a single barb which is attached to the long shaft by a thick rope. They use this kind of spear when the Mahseer are moving up to spawn. As soon as the spear strikes the fish the spear head loosens and remains in the fish whilst the long bamboo, attached to the head by the rope bobs up and down on the surface of the water and shows where the fish is, the latter is captured when exhausted. They sometimes catch 40 and 50 pounders in this manner.

The other spear has three prongs and with it they either stick their fish from the bank or in deep water from a boat,

My Khasia ghillie always used this method to land my fish. I seldom lost a fish, once however when the spearman entered the water the fish made a rush and the line got round his legs and snapped.

Fshing with rod and line.—The Khasias use as bait flying termites and green grasshoppers or sometimes pieces of the fresh-water crab.

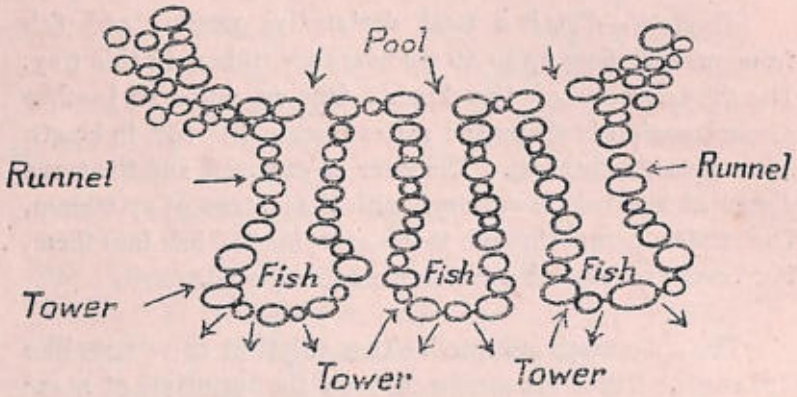
Trapping.—This is a most destructive method and fish from one inch long up to 40 pounders are taken in this way. The fish traps are of two kinds. One is made of bamboo or cane, conical in shape and varies from a few feet in length up to about twelve feet. The river is dammed and the traps placed at intervals in openings with the entrance up stream. The water pours through them carrying the fish into them, The traps are emptied at intervals and replaced.

The other traps are small, either elliptical or square, like bird cages. They are constructed on the principle of a rat trap. The fish enter but cannot get out owing to the sharpened bamboos inside the cage at the hole of entrance. These cages are sometimes baited with small pieces of fish or crab.

The most destructive trap of all for catching large fish is constructed entirely of stones and made as follows. When the rivers are falling, after the rains, the Mahseer come down from the higher reaches to the warmer in the plains. The end of a large pool is dammed up with boulders several feet high ; every here and there an opening is left and this leads into a runnel, the sides constructed of boulders and the runnel leads into a castle or tower, about five feet high, made of large boulders. In this way practically the whole river is diverted into these channels and all the fish are carried into these towers, stranded there and caught. One year I saw these towers full of Mahseer varying in weight from 12 to

40 lbs. I got into one of them and tried to get hold of a big one and was nearly knocked down in the attempt. The diagram illustrates this trap and the arrows facing down indicate the direction of the stream.

The larger fish are split open and dried in the snn and sold in the bazaars in the plains or in the local villages in the hills.



The Khasias cultivate the orange, betel palm and betel leaf and generally are well to do. They manufacture a very potent spirit from millet and many are great drunkards. During big festivals they all get drunk except the women who remain pretty sober.

(To be continued.)

To

THE EDITOR,

THE JOURNAL OF THE DARJEELING

NATURAL HISTORY SOCIETY.

The following note on the Shou may be of interest. In the summer of 1921 I saw two hinds with one young one in the forest above the east side of Lingmotang plain in the Chumbi valley. I am not aware of any having been seen since then and it is possible that this fine stag is now extinct in this locality.

The possession of fire arms of comparative efficiency among the local population in the out of the way parts of Tibet and Bhutan where this stag is, or was, known to exist, does not bode well for its preservation ; but the stags seen by me in Tsari district will, it is to be hoped, be preserved for religious reasons. This land is so holy that no life may be taken there, and at certain times of the year pilgrims will not travel owing to the danger of treading on a worm or insect on the road. This will probably preserve this magnificent animal from total extinction for many years to come, by which time modern methods, such as a game Reserve, may have reached these out of the way valleys.

Yours faithfully,

F. M. BAILEY.

Lieut-Colonel.

Resident in Kashmir.

Insect colouration and the relative acceptability of Insects to Birds.

In the Transactions of the Entomological Society of London *(Vol. LXXX, Part II of 31st December, 1932)* there is a most interesting paper by Dr. Frank Morton Jones, Sc. D. on the above subject.

The theory of "Warning Colouration" is that certain colours or colour-patterns exercise an influence on the acceptability of certain insects as food for predacious creatures. "Protective Mimicry" can only be deemed true if the mimicked derive some immunity through their possession of these characters.

The experiments were carried out on the Island of Martha's Vineyard, Massachusetts during the summers of 1930 and 1931. A feeding tray was used and placed on the edge of a woodland much frequented by birds : these were attracted to the spot by a supply of water and small quantities of seed, grain and suet. In place of, or in addition to, this food freshly killed insects were placed on the tray and the birds observed through field-glasses. The average number of insects at a time on the tray was about fifty. Sometimes the experiments were over in half an hour, at other times two or three hours elapsed before the most acceptable insects were taken and the bird visits ceased. More than a hundred experiments were made "involving more than two thousand bird visits and the use of more than five thousand insects." Records were kept of the accepted and unaccepted insects and those of each species assembled and an average "acceptability rating" obtained. Some most interesting tables are given. The lists have been divided into three sections—

I those with acceptability ratings between 60 and 100.

II those with acceptability ratings between 25 and 60.

III those with acceptability ratings 25 or lower.

Those of Section I with each group's record of the numbers left on the tray have been summarized as follows. They are only for moths and beetles.

Summary, Section I of Insect species Rating from 60 to 100.

Lepidoptera.	No. of species.	No. of insects.	average acceptability.	Left on tray.	Bird visitors.
Sphingidæ ...	7	95	93·3	0	1,2,3,4,5,7,9,10,
Saturniidæ ...	2	14	82·2	0	1,2,3,4,5,6,7
Arctiidæ ...	7	119	69·1	2	1,2,3,4,5,6,7,8,11
Noctuidæ ...	38	666	78·3	3	1,2,3,4,5,6,7,8,9,10
Notodontidæ ...	11	311	80·4	1	1,2,3,4,5,6,7,8,9,10
Lymantriidæ ...	1	56	84·9	0	1,2,3,4,5,6,7,8
Eupterotidæ ...	1	23	86	0	1,2,3,4,5,7
Lasiocampidæ ...	1	146	75·3	0	1,2,3,4,5,6,7,8,9
Geometridæ ...	8	120	71·7	3	1,2,3,4,5,6,7,8,9
Limacodidæ ...	1	5	81	0	1,2,4,5,7
Tortricidæ ...	1	5	71·6	0	2,4,5,7,8
Total Lepidoptera.	78	1560	78·5	9	1,2,3,4,5,6,7,8,9,10,11
Coleoptera.					
Tenebrionidæ ...	1	2	79	0	1,2,4
Scarabæidæ ...	11	847	78·7	18	1,2,3,4,5,6,7,8,9,10,11
Total Coleoptera ...	12	849	78·7	18	1,2,3,4,5,6,7,8,9,10,11
General Total ...	90	2409	78·6	27	1,2,3,4,5,6,7,8,9,10,11

Thus "98·8% of 2409 of these 90 species were eaten, only 1·1% were left uneaten on the tray."

During the experiments it was found that *size* had a great influence on acceptability. Only referring to the

families of moths in which large numbers were used, it is seen that large moths such as the *Sphingidæ* come first with the highest percentage 93·3 ; that the more moderately sized *Noctuidæ* and *Notodontidæ* show a combined average of 79%. Of smaller species, 185 specimens of a Pyralid were used, of which 8 were left on the tray, the average acceptability was only 52·2. The same was found in the beetles. The largest scarabæid used showed an acceptance of 92·6, smaller insects of the same family showed an average of 81.2 and in others, also of the same family and very similar in general appearance, but only half the size, the average acceptance was only 58·8. Although this shows that *size* has a great deal to do with acceptability yet insects of comparable size are found in abundance in all three sections so that there must be some other reasons than size alone to account for this discrimination.

From a study of the observations made it appeared that colouration was a probable determinant of relative acceptability. Several interesting tables are given proving this which we will only summarize. In that of Section III, of which the acceptability rating is low four groups are given.

A. Insects conspicuously marked with yellow, orange, or red. 321 insects were used, of which 293 were left on the tray.

B. Insects exhibiting these colours, but less conspicuously. 22 insects used, of which 18 were left on the tray.

C. Insects brilliantly metallic and polished. 22 insects used all of which were left on the tray.

D. Insects exhibiting other types of colouration. 58 insects used of which 50 were left on the tray.

This shows that 81% of insects conspicuously marked with yellow, orange or red and brilliant metallic coloured

insects have low acceptability ratings and *not one of the 90 species and 2,409 insects* of Section I (insects fully acceptable) conform to either of these types of colouration when at rest. Thus " usually the less acceptable species are those exhibiting in bold patterns with other colours, either yellow, orange, red or those possessing a brilliantly metallic lustre."

The next table shows insects of Section II, with colouration approximating that of Section III, Divisions A or C. In this " 163 insects received an average acceptability rating of 36·9, in contrast with that of 78·6 credited to the 2,409 insects of Section I.

Other tables show.

Insects entirely or nearly white. 28 insects show an average acceptability rating of 55·4. In size these insects " are not below the average of the 1,560 insects in the same order included in Section I with an average rating of 78·5.

Black and white in conspicuous pattern. 11 insects show an average almost identical with the preceding table.

Pink and pale yellow. 24 insects show " the average acceptability rating for below that of most moths of similar size."

" Dead grass " pattern of the genus *Apantesis (Arctiidæ).* 32 insects, the largest and most brilliantly coloured of these show the lowest rating of acceptability 39·7.

Experiments on a smaller scale were made with butterflies and it was found that in "comparison with moths they were not so generally or promptly acceptable." The 76 butterflies used only showed an acceptability of 37·3 whereas the 2445 moths showed one of 65, but one thick bodied Hesperid butterfly was as promptly accepted as the Noctuid and Notodontid moths of similar size. He found that with *Danaida,* a generally unacceptable butterfly, three out of six were taken from the tray ; some birds wouldn't touch this butterfly but one bird (*Turdus migratorius*, Linn.) appeared

to find "nothing strongly deterrent in this insect, in the process of preparing it for swallowing." Apparently this bird was not actually seen eating the insects but only battering them to pieces.

We may here mention in this connection that in the Proceedings of the Entomological Society of London (*Vol. VII, Part II of 31st December, 1932*). Professor Poulton quotes some paragraphs from Miss Cheesman's *Hunting insects in the South Seas*. We re-quote these paragraphs.

"The Monarch [Danaida plexippus, L.] is supposed to possess the same natural protection as the caterpillars, probably an acid flavour which causes the knowing ones among their natural enemies to fight shy of them; but on these Islands [New Hebrides] there is at least one formidable enemy —the blue kingfisher, which is all over the group and generally to be found near the coast. I have watched this bird catch a Monarch butterfly by a very clever swoop in the air. And at South-West Bay on Malekula, in the coconut plantations where there were always numbers of this butterfly to be seen, several times I have found their torn wings on the ground among the Asclepias plants. Since there were several kingfishers haunting that locality the circumstantial evidence cannot be doubted. On one occasion, on a small knoll I estimated as many as nine butterflies must have been slaughtered. The size of the heap of torn wings was quite startling, but there were many living butterflies flying about there all day sipping nectar from the orange coloured flowers which grew in a glowing patch on the same knoll.

"Such a sad tragedy is probably only of local occurrence, for this butterfly is considered as practically immune from attack by insectivorous birds, lizards and small mammals. It seems curious that, where there must be plenty of other food, any bird should cultivate a partiality for an insect

which is not tolerated by other birds. But it is only corroboration of the general rule that what appears a piquant flavour to one palate may be nauseous to another."

Professor Poulton also exhibited a specimen of *Danaida genutia*, Cram., sent to him by Mr. H. G. Champion from Dehra Dun with all four wings symmetrical shorn apparently done by a bird.

After this diversion we will continue the original article, the author of which thus summarizes these experiments.

"By considering the insects of these experiments by groups, we have shown that *size* has a measurable effect upon relative acceptability; that insects, exhibiting certain types of coloration are usually refused; and that other types of coloration, and factors not so surely definable, contribute to a gradation of acceptability, from the few and less acceptable to the many and fully acceptable. These conclusions find further and convincing confirmation in the records of individual species, some of which will be set forth in the following pages." The author then goes on to individual species.

Other experiments were made in "an attempt to demonstrate the possession of distasteful or possibly of poisonous qualities in some of the insects avoided by the birds, and in a manner which eliminates the colour factor from the problem. That the experiments are based upon the reactions of life-forms widely unrelated to birds removes them from the status of direct and positive evidence." These experiments were made with small ants. The author hoped that "through an agreement between bird-rejected and the ant-rejected species, that to this extent confirmatory evidence of the real basis for rejection might be secured. He discovered that *infusions* of some of the insects mixed with known acceptable food of ants did "in some instances deter

the ants from accepting that food, while infusions of other insects exerted no deterring effect." By making these *infusions*, differences in colour and texture were eliminated from the experiments.

Fresh cream was used as the food medium in these experiments. "The solvents used were amylacetate, grain alcohol (these two attractive to ants rather than deterrant), chloroform (repellant until it evaporated from the material tested), and water." The insects were cut or crushed into small fragments, placed in the solvent in a clean vial, and allowed to stand for a few hours. A few drops of the infusion were incorporated with the cream and spread on a numbered place on a plate. "Insects of four Orders, of thirty-three families, and upward of a hundred species, were tested in this manner." It was found that many species were acceptable to both birds and ants but others were acceptable to the ants but less so to the birds. The refusal by ants was of rare occurrence. The results of the experiments showed that no general agreement could be expected between the experiments with birds and with ants. The author's conclusions are as follows :—

(*a*) "That insect acceptability to birds is relative, and that the causes determining relative acceptability are complex.

(*b*) That insect coloration has material influence upon insect acceptability.

(*c*) That in general, insects with duller colours and obscure patterns are the more acceptable, those with brighter colours and bolder patterns the less acceptable.

(*d*) That those least acceptable are often characterised by conspicuous markings of yellow, orange, or red or are brilliantly metallic ; and that these

types of coloration are usually correlated with a daytime habit of display rather than of concealment.

(*e*) That the experiments with ants demonstrate the presence of a deterrant in a few insects, and that while no complete parralelism exists between the tastes of birds and of ants, all of the insects refused by the ants and used in the experiments with birds were among those most consistently refused by the birds.

(*f*) That the food of the insects found to possess these ant-deterrants consists of the leaves and juices of related acrid and poisonous plants ; and that the circumstances of its occurrence indicate that the deterrant is derived from the food-plant, if not identical with its poisons.

(*g*) That the great prevalence of the types of coloration commonly interpreted as "warning coloration" among the insects feeding upon these plants, and the behaviour of both the ants and the birds toward the insects having these food-plants, affords ground for the belief that in these insects warning colours and plant-derived deterrants (poisons ?) combine to make them relatively unacceptable to birds.

(*h*) "That the relative unacceptability of many insects to birds must depend upon other factors, not upon plant-derived deterrants."

"That warning coloration as a defensive character does not provide complete protection against most enemies—that against one or several it may fail completely—does not invalidate our belief in its reality as a factor in that complexity of contacts with their environment which condition

the survival of every species. As Dr. Karl Jordan has expressed it, "The main arguments against the effectiveness of protective coloration are based on a fundamental misconception. There is no absolute protection anywhere. Protection is relative like everything else. A steel helmet did not prevent soldiers from being killed, but far more would have been killed without it."

The article is illustrated with one coloured and ten other plates.

EDITOR.

DARJEELING NATURAL HISTORY SOCIETY.

The Society was started about the end of 1923, the objects being to maintain the Museum in a proper condition; to promote the study of Natural History and to get together, as complete as possible, collections of Natural History specimens from a limited area, including "the civil districts of Jalpaiguri and Darjeeling and the State of Sikkim", as well as what could be procured from the neighbouring countries of Tibet, Bhutan and Nepal.

The Government and Municipal grants not being sufficient for our purpose, it was proposed to enrol members so as to increase our funds, and a Quarterly Journal has been started. It is hoped that everybody will join the Society and co-operate to make the Museum and Journal a success.

The annual subscription is only Rs. 10.

Application for membership should be mad eto :—

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JOURNAL

OF THE

DARJEELING NATURAL HISTORY SOCIETY.

Vol. VIII. No. 2.

Game Birds of Sikkim, including the Darjeeling District, and of the Jalpaiguri District, Bengal.

By

C. M. INGLIS, F.Z.S., F.E.S., E.M.B.O.U.

(Continued from page 6.)

Our next genus *Coturnix* contains the true Quails. In this genus the sexes though different in colour do not differ so much as in *Excalfactoria* ; the tail too consists of 10 to 12 feathers. The wing is long and pointed ; the legs have no spurs. The genus is represented by three species and subspecies in India but only two of these are recorded from our area and one of these is doubtful.

(35) The Common or Grey Quail.

Coturnix coturnix coturnix (Linn).

The cock has the crown brown banded with black and with a narrow buff stripe down the centre and a broader one over the eye. The upper plumage is light brown with broad pointed buff streaks and blotched with black and banded with rufous-buff.

The wing-quills are light brown barred on the outer webs with rufous-buff, except the first primary which has

Schleg. is to be also found. This Eastern Quail has been recorded on the evidence of a female skin from Bhotan." This specimen is in the British Museum and Stuart Baker, who has examined it, considers it to be the common Western form.

In the Duars, according to O'Donel, they are mostly seen in October on their downward migration when they, apparently, only remain a short time probably about a fortnight or so. This year (1933) there were quite a number in the Duars in suitable places like Binnaguri. Travers writes in July 1933 :—" Last cold weather I bagged 9. There were a few about. For two years previously there were hardly any. I saw none. Once about 30 years ago there was a large influx, when 12 and 15 couple were shot on an afternoon."

These Quail have been found at considerable heights, occuring in the Himalayas up to 8,000 feet and Ludlow found it near Gyantse at 12,000 feet.

The huge numbers of Grey Quail seen in this country are mostly migratory entering India on the west from Africa and Arabia, also through Afghanistan and Baluchistan, as well as from the North, near the Himalayas, from Central and Northern Asia. Baker thinks that few, if any, cross the Himalayas East of Nepal. Hume considers that the birds that come from the West are the earliest to reach India, arriving there in August and those that cross the Himalayas from Central Asia arrive in September most of these early arrivals move Southwards and Eastwards reaching districts in Bengal such as Dacca, Faridpur, etc., sometime in October. Later migrations take place large numbers reaching Karachi from seawards in November and December. Ludlow got one at 12,000 ft. at Gyantse in December possibly one that had got left behind during migration.

The number of Qnail which arrive in India and the distance to which they spread over the country appears to depend on the supply of food on their breeding grounds and in the intervening country so that in some places where huge numbers are seen in some years, few or none are seen in others, even if the food supply happens to be good, apparently because the food supply has been sufficient for them in those intervening areas. Rainfall seems to have nothing to do with their migration as, in Bihar, in two years with the same rainfall one was a very bad and the other an exceptionally good year for Quail. We kept data of this for a period of seven years.

As already noticed most of our Quail are only visitors and appear to migrate wholly at night. Hume wrote, " on one moonlight night, abont the third week in April, standing on the top of Benog, a few miles from Mussooree, a dense cloud, many hundred yards in length and fifty yards I suppose in breadth, of small birds swept over me with the sound of a rushing wind. They were not, I believe, twenty yards above the level of my head, and their unmistakeable call was uttered by several of those nearest me as they passed.

The Grey Quail may he found in dry rice stubble, they eschew damp situations, in standing crops, either high or low, and in grass or scrub jungle, but above all they seem to prefer crops and it is in those parts of the country which are highly cultivated that Quail will be seen in vast numbers.

They feed mostly in the morning and evening, resting in the middle of the day and if one walks quietly through rice stubble they may be seen running here and there, picking up grain, etc., or standing straight up to listen. scuttling off to thicker cover at the first sign of danger. Their food consists of grain, grass-seeds and small insects.

The usual note heard, the call of the cock, is a long, loud whistle followed by two shorter notes, like *wet-my-feet*, which as Whistler says, is better still represented by the Kashgari name *Watwalak*. They have, however, other notes such as a sharp harsh note of alarm, a low chirping whistle uttered when feeding and a note resembling *beebewe* when calling each other.

Where numerous they form most excellent sport. They fly fast and very straight, just skimming the tops of the crops and then dropping suddenly into cover. They will rise, with a whirr, practically at one's feet and seldom fly further than 50 yards or so. They never keep in coveys, but several birds may be seen together. They rise and fly singly but where large numbers occur they are continually rising and rights and lefts are generally got. In the old days in Bihar when they had Quail shoots the guns got too hot to hold with the continual bombardment. Huge bags were made but we have no records of them, Hume, however, mentions a hundred brace being bagged in one day by a single sportsman. We think it is pleasanter, however, to stroll out of an evening, either with a few boys or a dog on a long leash, work through the paddy-stubble, chillies or other crops and pick up whatever birds one can. Big bags are not to be made like this but one can return home with half a dozen birds quite sufficient, surely, to content any sports man.

Hume found it excellent sport shooting Quail from a *machan* in high crops. We have never tried this so quote his account.

"First you look out for the *machan* whence the people watch the crops to keep off the birds, which is almost always at one edge of the field, and where that abuts on some barren plot or bare field intended for the spring crops. If this particuliar one is not so situated, you move on to

one that is. Then you put your beaters—and they should be numerous and each have a stick—in at the opposite side of the field. Then you ascend the "*machan*," light a cigar, and, as the Walrus says to the Oysters, "admire the view."

"In the meantime the beaters, if they know their trade, will beat very slowly through the field in a more or less semicircular order, the concavity towards the *machan*, not talking, but rustling vigorously about with their sticks at the bases of the dry stalks. Probably the first thing that distracts your attention from the surrounding scenery is a tremendous rush and a general hoorush (the best trained beaters are but men !), and, swiftly parting the waving stems, you see an old black buck coming at a headlong pace towards you, his nose straight in front of him, and his horns laid well back on his shoulder. You don't move (and even if you did, when he was close to you he would see nothing above him), but just as he emerges in the open, if not more than twenty-five yards distant, you roll him over with a buck-shot or S. S. G. cartridge in the neck. If further and you have a rifle, it ought to come (though it sometimes *don't*) to the same thing. Then your Pathan, who has been crouching at the base of the *machan*, glides out and solemnly cut's that buck's throat in the name of the Almighty.

"The beaters have by this time repented of their enthusiasm ; they are dimly conscious that, that "hoorush" may not be viewed in a favourable light, and that it would be well for them if the "Protector of the Poor" aloft (on the *machan* I mean) got a good many more shots before they again interviewed him. As they advance perhaps two or three greys, a whole brood of Pea-chicks, or possibly a black or two (I mean Partridges, shooting the other kind *est expressiment défendu*), and almost certainly a hare or two make their appearance, the former skimming along about the level of the *machan*, lovely cross shots (some of course, but not many with well trained beaters, out of range), the latter

tippety tap, without the faintest conception of looking up, halting probably to listen with ears erect just outside the field, perhaps not five yards from the *machan*.

"And now the flank beaters have got down to the edge of the field where your station is, and now the Quail begin to rise and whirr past, and nine out of ten birds will pass within shot if the thing has been properly managed. You are now in the warm corner, and the birds will rise much quicker than you can load and fire, unless you have a rule that at each shot every man halts and keeps perfectly still until you whistle. Even then, as the semicircle contracts, the Quail whirr up in threes and fours, end many will get past without running the gauntlet of your fire.

"If, as often happens, there are a few scattered bushes here and there dotted over the fallow field, 5, 10, 15 yards away from the edge of the field, and you whistle a halt, get down and yourself walk through them, quietly, putting your foot into each, you will probably find that, despite the terrific fusilade you have been keeping up, almost every tiny patch contains one or more Quails.

"I have thus occasionally killed over a dozen brace, besides other game, from one platform ; but even if you get only five or six brace all told, there is "a rapture of repose" about the arrangement, which I confess has always had many charms for me."

Large numbers of Quails are snared alive and sold for food or the cocks often for fighting purposes these being very pugnacious. We wrote two accounts in *Vols. XXVII & XXIX* of the *Bombay Natural History Society's Journal* on snaring Quail in North Bihar which we will transcribe.

"In the Darbhanga District the Quail catcher makes use of a slightly different method to that given by Sterndale and

quoted by Hume in his Game Birds of India (Vol. II. p. 145). It is probably the method Jerdon writes about as follows :—

"The Nepalese have an ingenious way of catching Quail. They put a pair of imitation horns on their heads, and walk slowly about the stubble fields twisting some blades of grass in their hands in a way to imitate the champing of grass by cattle, and as these birds are not alarmed by cattle, they succeed in driving any Quail they see under a small net, which they then drop and secure the bird." This account does not quite correspond with the method employed here. The Quail catcher, as described by Hume, made use of a bullock to drive the birds up to the net and "his traps consisted of a series of rectangular frames, made of laths, about two feet long by one foot broad (a tightly stretched net occupying the interior of each frame) joined at the ends and folding up like a long map. There were about a dozen of these frames and the centre one had an aperture in the net large enough to admit a Partridge."

Here the man, as described by Jerdon, is both bullock and snarer and he only uses a single net.

In this District Quail are snared by several castes of people but principally by the *mallahs* (fishermen) and it is only some of them who go in for it. The birds caught are practically all the common or Grey Quail (*Coturnix communis*) with very occasionally a Rain or Black-breasted (*Coturnix coromandelica*) one or else the Little Button-Quail (*Turnix dussumieri*) although the Indian Button-Quail (*Turnix t. tanki*) is also got here, I have had none brought to me by these men. The following is the proportion of each species, out of a total of 128 brought to me by the snarers up to the time of writing :—Grey Quail 120, Black-breasted Quail 1 and Little Button-Quail 7.

In the paddy stubble and where the Khesari (*Latyrus sativus*) is small, the snarer only goes after the Quail in the

early morning and in the evening as these are their feeding times and the birds move about freely them ; but where the Khesari or gram (*Cicer arietinum*) is higher, he snares till later in the morning, as there the cover is shadier and the birds will scuttle about a bit and are not frightened of birds of prey as they are in the thinner cover in the late morning.

On reaching the spot he intends to work, the catcher first of all takes a sheet and rolls up two corners of it for about six inches, those he ties with a piece of straw or grass to keep them from unrolling ; the rolled up corners are meant to represent a cow's horns ; then he gets two thinnish pieces of bamboo about two feet seven inches long, and about five inches from the ends he ties them together cross ways ; the long ends are inserted into the horns and the short ones rest against his chest ; the sheet is now thrown over his head and down his back reaching to his ankles and the end with the horns sticks out like a canopy in front of his head ; he ties the sheet round his neck and this keeps the canopy taut ; the rest of the sheet is wrapped round the body.

The net he uses is made of six strands of cotton twisted into thread and is six feet long by two feet seven inches broad and its mesh has a diameter of about an inch ; it is weighted with baked clay pellets along one side of its length and at the ends of the opposite side a couple of pointed sticks, about eighteen inches long, are tied ; another stick of about the same length being fastened midway between these two.

The net is shung over his shoulder and he draws the sheet round him, covering his arms. He is now ready and the sport begins. With the cloth well wrapped round his body, the snarer stalks, with short steps and very slowly, through the field, every now and then bowing so as to imitate the motion of a cow's head. When a Quail is seen, he heads it off and at a short distance in front of it fixes

his net the weighted end lying flat on the ground, the opposite side being raised about one foot in the middle and rather lower at the sides, and kept in this position by the three sticks ; this open side is set facing the direction in which the Quail is to be driven. The man now circles round the bird so as to get behind it and then the driving commences. Now he moves slowly forward, now sideways, bowing at intervals and very quietly working the Quail towards the net. If the bird appears rather wild, he slowly assumes a crouching position and crawls along with his head towards the ground to represent a cow grazing ; in this way he guides the Quail to the net. Should the Quail be fairly tame he does not require to crouch but can work the bird into the net in an erect position. When under the net the Quail tries to burst headlong through the meshes instead of running to the side where it could easily escape as the net does not drop. As soon as the snarer sees the bird is inside he rushes forward and captures it and ties it up in his loin cloth. Should the bird pass by the net, it is headed back again or else the catcher takes up the net and fixes it in another position. It is wonderful seeing the Quail being worked up to the net, this being done in a most skilful manner. Occasionally more than one bird is captured at a time but as a rule the snarer contents himself with working one unless several keep well together. The birds seldom seem to rise, except in newly worked fields where no cattle are grazed, and if one does fly off the catcher does not as a rule followed it up unless birds are scarce. While stalking the men have a most weird and ghost-like appearance.

In Hume's day Quail sold even in cities like Lucknow for Rs. 2 to Rs. 2-8-0 a hundred and he bought them in small stations for Re. 1 per hundred. Those days have now gone and like everything else the price of Quail has more than doubled. Here in the mofussil they now sell for Rs. 6 to Rs. 11 a hundred."

These notes were written ten years ago and probably the price of Quail has gone up considerably since then.

Two years later I had an opportunity of studying the snarer's methods in tall crops such as *rahar (Cajanus indics)* to which Quail retire during the heat of the day.

No preparation is required in the way of dress in snaring by the following method, but more people are generally necessary, the number varying from three to eight. On arriving at the spot where the *rahar* fields are situated, the men, if the fields are not of any large extent, skirt round them, crouching and looking into them to see if they hold any birds; they then fix a site for their nets, selecting a spot in which the crop is thin or absent. The nets used are the ordinary fishing ones. They are stretched out, the ends being tied to the crop or any jungle that may be handy, and the portion resting on the ground is weighted down with clods, except in those nets, such as casting nets, which are already weighted. On the flanks of these nets, the smaller nets (as described in my previous article) are fixed, the whole extending for about 11 yards. Any crop that may come under the net is bent down and the net passed over it and this keeps the nets in a raised position.

The driving now begins. If there are several fields of *rahar* adjoining each other, the snarers usually try to drive the Quail into one plot. The driving is done by wriggling along in a squatting position, every now and then gently shaking the crop and the whole time keeping up a low whistle. The Quail either run or walk along in front of the beaters and are headed towards the nets and finally captured. Sometimes a dozen or twenty birds are snared at one time and sometimes a blank is drawn. I have been with the men several hours when nothing was caught, this being generally due to the Quail having been disturbed by grazing

cattle and made very wild. Sometimes other birds besides Quail are captured and on one occasion these consisted of a pipit and a water hen ; a mongoose also got into the net but got away. I once chased away a fox, fearing the damage it would do to the nets if it got entangled in them.

This season was an exceptionally good one for Quail, hundreds being snared. Of the large number I saw, all, except about a dozen Little Button—Quail *(Turnix dussumieri)* and one Black-breasted Quail *(Coturnix coromandelica)* were the common species *(Coturnix coturnix coturrnix)*.

We used to keep the snared Quails in Quaileries, fatten them up and keep them through the hot-weather and rains, but this custom seems to be dying out. The Quailery should be kept fairly dark otherwise the cocks fight continually. It is only those who have kept Quail like this that know what a delicious morsel a fat Quail can be.

Sparrow-Hawks and Shikras used to be flown at Quail but it must have been very poor sport as if the hawk found the quarry outdistanced it, it just sat on a clod and waited to be picked up.

These Quail are, except in captivity and possibly where they breed in large numbers, monogamous, and the hen is a very close sitter. Hume once caught a "female on the nest, examined the eggs, found the points of the bills protuding in two, so put them carefully back, and replaced the mother gently on the nest, where she sat winking at us in a most unbecoming manner, but never attempting to leave the nest."

Numbers of these Quail are resident and breed in India and eggs have been taken at various places from Sind in the West to Purneah in the East and Baker has shot breeding birds in Dacca and Mymensingh. The principal breeding months appear to be March and April.

The nest is a mere depression scratched in the ground by the bird and lined with a few bits of dry grass and situated

in crops, amongst grass, especially where there are thorny bushes. They lay from 3 to 14 eggs but apparently 10 is the most they lay in India. They are broad ovals, a good deal pointed at one end. The oolour varies considerably. Stuart Baker describes them as follows :—"The ground varies from palest creamy to a warm buff, reddish brown or yellow stone-colour. In some eggs the whole surface is covered with innumerable speeks and freckles of dark brown, in others these freckles are fewer and are intermixed with a few small spots and blotches : in others there are no freckles and the blotches are very large, bold and almost black ; in others again the freckles are so tiny and pale that at a little distance the eggs look pale clay-yellow, brownish-grey, or olive-brown. Between these variations there is every degree of intermediate colouration." They average in size about 1.18 × 0.89 inches.

These Quail are uninteresting birds to keep except for food or to those who enjoy Quail fighting as a sport. Large prices are paid for stand-out cocks, Stuart Baker mentions as much as Rs. 50 having been paid for one of these in Bihar. They are very pugnacious and will sometimes fight to the death.

The Israelites are supposed to have lived on Quail in the Wilderness. Some authors think they lived on Sand-grouse, locusts or flying-fish but there seems no reason to suppose that they were not Quail judging from the description and the vast numbers in which they migrate. Yarrel mentions as many as 160,000 being netted, in one season, on Goat-Island, a small island at the entrance to the Bay of Naples and Temminck wrote that 100,000 had been captured in one day nearNettuno in the Kingdom of Naples.

The maximum life of these birds in captivity is 7 years 11 months and 16 days.

(To be continued.)

The Assam Black Partridge.

Francolinus francolinus melanotus Hume.

BY

C. M. INGLIS, F. Z. S., F. E. S., E. M. B. O. U.

(With a coloured plate.)

There is no necessity to give a description of this bird as our plate shows that. The cock bird is represented calling from a stump and the hen at rest. Hume mentions an albino obtained by Hodgson in Nepal which was "a sort of delicate lilac grey ; the ear-coverts and body spots greyish-white ; the back, rump and upper tail-coverts barred as usual, but with greyish dusky ; but the broad neck ring dull chestnut, and the lower tail-coverts bright ferruginous chestnut."

This handsome Partridge used to be common in the Duars but they have sadly decreased, partly owing to the opening out of savannah land and greatly due to the tea garden coolies, especially the Sonthals, who love shikar and who, according to Travers, run down many and many a Partridge.

The distribution of this race of Black Partridge, which differs from the other two races found in India by being much darker in colour, is given by Stuart Baker as :— "Eastern Nepal, Sikkim, the whole of Assam and Eastern Bengal, Manipur, Lushai, the Hill Tracts of Chittagong and Tippera. Birds from Central and Central West Bengal are also rearest this race, as are those from Orissa, though somewhat intermediate."

Stevens doesn't give it in his *"Birds of the Sikkim Himalayas"* nor do there appear to be any Sikkim specimens in the British Museum ; there is one collected by Mandelli in the Darjeeling Terai in March and we have heard of its occurrence there.

They are principally found in grass lands, either in the thatch grass in the tea gardens or in the larger stretches of savannah where these are still to be found ; they may also sometimes be seen in the tea. Their cheery call rings out morning and evening and also at other times during the day. They are most vociferous during the breeding season. The cock calls from some eminence such as a stump of a tree, an ant-hill etc. and the call has been syllabalized in various ways such as *"lashun, piaj, adruk"* (garlic, onion, ginger) or *"Subhan, tere Kudrut"* (Oh ! Omnipotent, thy power) or in English by "Be quick, pay your debts." It is unusual for them to perch at any height from the ground but, in Hume's time, Mr. Greig wrote that, in Garhwal, he had "seen them high up in Chir trees (*Pinus longifolia)*" and recently Mr. Riches saw two perched about 15 feet up in a Siris tree in the tea.

They are monogamous and probably pair for life and, except after the breeding-season, coveys are not usually seen. They are peaceful birds, even when breeding, the cocks, apparently never fight each other as is so common in most game birds.

They give good sport, rising perpendicularly and flying strongly and straight though slower than the English Partridge. They are shot either by walking through the thatch with a string of beaters or from an elephant in the tall savannah or other high cover.

They feed generally in the morning and evening on seeds, grain, insects, the shoots of grass, etc.

O'Donel told me about a curious accident which happened to one of these birds. It was startled from the tea by a plucking coolie and, on flying off, hit its head against the branch of a tree and was killed.

They are resident birds and breed from April to July. In the Duars they lay in May and June but Cripps once took

five fresh eggs from a nest, in the Western Duars, on the 16th July. Where found in the hills (as high as 6000 ft., in some places according to Stuart Baker) they breed in April. The nest is usually an ill-formed pad of grass and leaves placed in a hollow in grass or under a tea bush. They lay from 3 to 10 eggs, usually from 4 to 6, which may vary much in colour from stone colour to olive chocolate-brown or dark olive-green. The average measurement of 100 eggs, according to Stuart Baker, is 36·5 × 30·9 m.m.

As table birds Black Partridge are quite good eating though if only roasted they are apt to be rather dry.

They do well in captivity and can be allowed a good deal of freedom. They have lived for over ten years in the Alipur Zoological Gardens.

The Episode of the Darjeeling Bison,

By

E. O. Shebbeare, I.F.S.

That a wild Bison, of it's own accord, should wander into the heart of Darjeeling and actualy quench it's thirst at the fountain in the middle of the Chowrasta seems incredible. It is worth putting the facts on record while it is still possible to collect them lest the whole incident be written down a myth by sceptics in years to come.

In the early hours of Monday the 8th May 1922, some Dukpas bringing milk into the station saw the Bison lying under the *Cryptomeria* trees below St. Paul's School. As the habitat of the Dukpa and the Indian Bison do not ordinarily overlap they probably took it for a giant bull or perhaps for a tame buffalo. They proceeded to pelt the beast with stones and so got it on the move down the Jalapahar road, jumping

the railings in places, until it reached the compound of Campbell Cottage, the Police Superintendent's bungalow, where it remained among some ornamental bamboos for a time. Later, according to the Darjeeling Advertiser for May the 10th, 1922, it crossed the Chowrasta and went down Thorn Road, up to the Alliance Bank and back along the Mall to the Chowrasta where it drank at the fountain. From the Chowrasta it went down the footpath to Lebong, past Dant Kothi where it overtook Mr. Price going down to train his ponies at Lebong. Continuing down the Lebong road it met an unfortunate stone-mason, Kurbir Gurung, below the N. B. M. R. headquarters and killed him on the spot with a blow on the neck. Keeping on downhill, past the Monastery, it crossed the cart-road and stopped in the forest land on Phubsering Tea Estate. Meanwhile Mr. Price had told Mr. Bird-Wilson, who happened to be on leave from the Duars and was stopping at the Drum-Druid Hotel, and he and Mr. Allan Pascal went after the animal and got him in the Phubsering forest. There was some dispute between these gentlemen over the trophies and the head was eventually given, by the Deputy Commissioner, to Mr. Bird-Wilson. It is now in his bungalow at Bagrakote in the Duars.

How this, a full grown but youngish herd-bull Bison, came to perform it's extraordinary exploit is a mystery but it seems possible that the epidemic of Rinderpest, which almost exterminated the magnificent herds of Bison in the Terai that year, was responsible in some way. Before 1922 we estimated the Bison between Sukna and Sivoke at about two hundred head, a mere guess of course, but it was possible to get among the herd on an elephant at any time. In the cold weather they could almost always be found at the foot of the hills in the neighbourhood of the saltlicks, especially in the Chocklong gorge, while, during the rains it was not necessary to go so far as there were generally a few in the Panchenai close to Sukna bungalow. I have sometimes shown the herd to

visitors to Darjeeling between the times of the up mail and the up mixed trains.

Then came the epidemic spreading no doubt from the herds of tame cattle in the adjoining Baikuntopur forest and caught at their common drinking pools. In November 1922 Mr. Trigg and I, marking over a square mile of sal forest, came on no less than seven skeletons of Bison in this small area. The following cold weather it was rare to come on any tracks of Bison in the area and they mostly solitary. The herds are only beginning to recover now. It seems possible that the sole survivor of a small herd might have pushed on blindly in the hope of coming up with his companions again.

The Darjeeling Advertiser *loc. cit.* gives an account of the movements of the solitary beast up to the date of his appearance in Darjeeling as follows :—"Came up the Balasan valley, up to Nagri spur, and stayed there two months, from there it took a line nearly straight across and went to the reserved forest above Chuttuckpur siding and stayed there a week, then went to Senshal, stopped another week and then came along the Calcutta road and slept in St. Paul's School compound."

It seems a pity that it did not survive to propagate it's species, none too plentiful here nowadays.

Mr Price's account.

"Shortly after dawn on the 8th May 1922, while on my way from the Club to Lebong to supervise the training of my ponies for the races, I was held up by the sentry at the Chowrasta, who tried to persuade me not to proceed as there was, he said, a "pugla Hauthi" in the locality doing a lot of damage which might, in it's fury, attack and hurt me." The sentry said "he had fiired at it with a shot gun and that a sahib from the hotel on the Mall also had fired at it with a rifle which had annoyed the animal." Excited, disheveled hill-men, perched on the Chowrasta bank, confirmed the

sentry's statements and urged me to seek personal safety in the band stand there. I ridiculed their warning taking them to be late night revellers, still under the influence of alcohol, for who had ever heard of a wild elephant or any such beast roaming about Darjeeling, so I proceeded walking to Lebong.

I was abreast of "Dant Koti", which is only about 300 yards from the Chowrasta, when I heard shouts of *"Sahib bhago."* I paused and looking back saw a huge beast, bigger than anything I had ever seen in the hills, rushing down the narrow Rungeet road and making for me. Whether it was presence of mind, or deadly funk, that influenced me I do not know, but I vaulted the road-side railing to get out of the way of the beast instead of trying to climb the bank which was my first momentary impulse. It was as well that I jumped the railing otherwise I would have been killed, for about fifty yards in front of me was a stone mason who, hearing the shouting of the people on the Mall road above, tried to get out of the way of the animal by climbing the steep bank. Before he could do so he was knocked down and ripped up by the "mad Hauthi" which would have been my fate had I not got out of it's way by performing the acrobatic feat above mentioned. I landed on a beautiful artificial bank of orchids in the Dentist's garden. My heavy weight of fourteen stone dismantled the bank, off which I rolled, unhurt, into a bed of choice poppies. The irate dentist instead of writing to congratulate me on my escape from bodily injury, if not death, served me with the bill of cost for renovating his darned old orchid bank and Rs. 5 for the damage to his bed of poppies! On recovering from the shock of the fall, which, as I have said, did me no harm, I continued on the way to Lebong, the body of the labourer killed being conveyed to the hospital dead house. About half a mile further down the road I came upon a crowd around another sad sight, that of a aged man, who had been tossed by the "Mad Elephant" on to the sloping roof of a house about twenty feet below the road.

The poor fellow rolled off the roof about ten feet down the khud-side where he was picked up dead. No one dared to arrest the progress of the wild beast, bigger and more furious than anything that had ever been seen in the hills. When I got to the Police outpost, about half a mile from the scene of the second murder, I was again stopped by the police who said it would be dangerous for me to proceed as the "Mad Elephant" was in the Lebong forest between the police outpost and the Cantonment. After much persuasion and some bucksheesh I got the loan of a pony from one of the Bhutia Busti "ghora wallahs" and made my way by a circuitous route to the Lebong race course. On arrival there and just as I had dismounted from the pony, I heard shouts again that the wild beast was coming down the road. I had time to get onto the grand stand, from where I had a good view of the animal. It was not a mad elephant but a magnificent Bison that had probably gone "Must". Opposite the race stand it jumped the parapet wall and disappeared into the Phubsering forest. By this time armed and enthusiastic sportsman from Darjeeling began to arrived at Lebong. They followed the track of the Bison and Mr. Pascal (Jr.), a local resident of Darjeeling, shot it at 3 o' clock in the afternoon somewhere in the forest. The head however was claimed and awarded by a tribunal to Mr. Bird-Wilson of the Duars who put in the first shot.

Fishing in India and in Europe.

By

Col. H. S. Wood, I.M.S.

(Continued from page 38.)

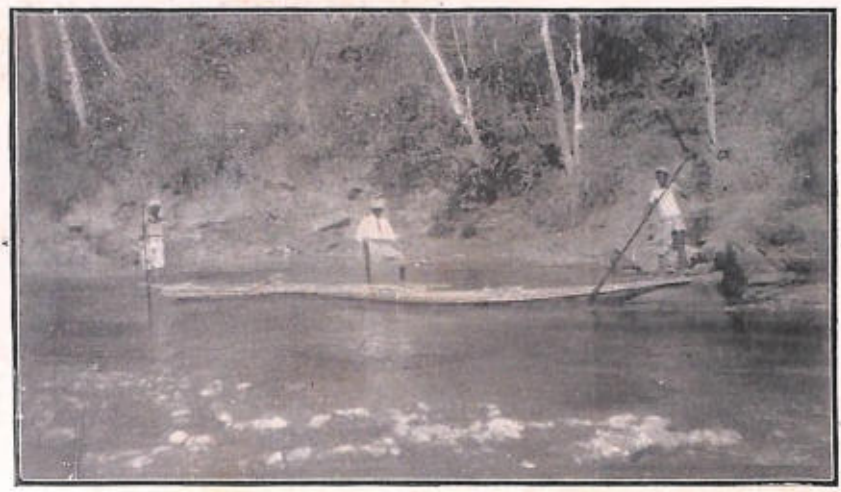
(With two half-tone plates.)

The Mahseer and what I know of him.

I do not know what the derivation of the word is, whether it means "big head" or "big weight". The Khasia name is *Matrol* and the Assamese *Petia Mas*. The Mahseer

is found in all the rivers in Assam, in the hills and in the mountains. Very large ones have been caught in the Brahmaputra near Gauhati and Tezpur with *atta* or flour paste. The Mahseer is found in Burma, North-West Provinces and in Mysore, the Cauvery being a good river there and where, I believe, the record Mahseer of 119 lbs. was caught by Rivett-Carnac. Those officers who had the luck to go into the Abor and Mishmi country and into the Hukong Valley report grand fishing in those places ; but one requires Government permission and an escort to enter those countries. The Dhansiri as it debouched from the Naga Hills was a grand place. I fished the pools for only an hour on my way down to Golaghat and got several heavy fish. This river is sometimes called the Doyang and becomes the Dhansiri lower down. For my part I do not wish for better fishing than that obtainable in the Sylhet waters mentioned previously. The fishing in the Teesta near Darjeeling and in the Sankos between the Duars and Assam are good from the records published in the Journal.

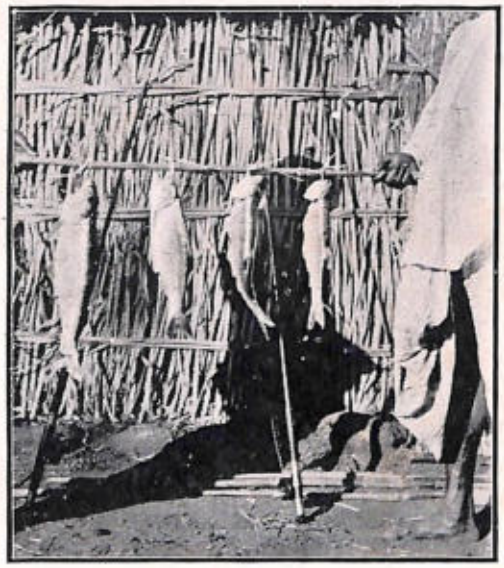
The Mahseer is the fish to go for in India, he is really the King of fishes and affords grand sport, besides this the scenery round his habitat is very beautiful. Every Mahseer fisherman has listened to the joyous sound of the screeching reel and felt the thrill of the rush of the mighty Mahseer as he takes out yard after yard of line, sometimes as much as 120 yards are taken before he stops. His rush is stronger than that of the salmon some of them will fight and be game to the end. I have found the long torpedo shaped fish the strongest and pluckiest. Your tackle must be strong and running freely when he rushes or else there will be a break and for God's sake keep your fingers off the running line or you will be cut to the bone, as once, happened to me. What a beautiful fish he is too with his scales of burnished gold, silver and copper and red fins, but alas ! these colours soon fade.



Our Fishing Boat.



A bag of CHILWA.



SOME FINE SPECIMENS OF
Barilius bola.



RECORD MAHSEER OF 119 lbs. CAUGHT IN THE CAUVERY
BY RIVETT-CARNAC.

The scientific name for the Mahseer is *Barbus tor*, he belongs to the Carp family and may be recognized by the barbels projecting from the lips and by the pharyngeal teeth. With regard to the varieties of the Mahseer I know many will not agree with what I say but I give my opinion and what I learnt from the Khasias. They distinguish 4 varieties :—

1. One with two kinds of mouths, *i.e.*, a variety with a long mouth which can be pulled out and one with a short one. These are the true *Barbus tor*, the fish with the elongated mouth being the female. These two fish have red fins.

2. The *Booka* or snub-nosed Mahseer. This is a true Carp and the colour is duller than in the last ; the fins are bluish-red and the pharyngeal teeth are broader and flatter. As the *Booka* is not such a cannibal as the true Mahseer, feeding more on falling fruits, weeds, grasses etc., it does not attain to a very great size, 12½ lbs. being the heaviest I ever got. A curious thing about him is that his fins are never entire, pieces, especially in the candal fin being bitten out. The Khasias have told me that this is done by a little fish with a beak like a parrot and which can blow itself out. They call it the *Poothla Mas*. I have seen little boys blowing these fish up as one does a toy balloon. Sometimes when bathing these fish will nip your legs. The Khasias hate the *Booka* and many will not eat them, as they say they devour the excrement of monkeys. I fancy there is something in this. A fruit which they are very fond of, a species of small fig is often found on trees overhanging the water. I have seen hosts of monkeys feeding on the berries and when the fruit fell into the pool below it was eaten by the *Booka* and other fish ; the excrement also dropped into the water and I do not think the *Booka* wold object to eating this. The *Booka* does not make the terrific rush like the Mahseer, he rather bores down into the depths of the water and shakes the line like a

bull dog. By this feeling you can always tell you have a *Booka* on. They take a G and S spoon well but one has to spin deep for them and in a pool they soon get scared of a spoon. During a sudden heavy spate, when the river gets muddy like pea soup, I have seen *Booka* spring into the air to get more oxygen. The teeth of the true Mahseer are much longer and pointed than those of the *Booka*, some having a distinct notch. They play on a hinge system and the teeth point downwards into the pharynx. They are admirably adapted for cutting purposes and their strength can be gauged by putting one's fingers down the throat of a small Mahseer. The teeth when taken out, dried and cleaned, look very well mounted on a large wooden shield. The teeth are composed entirely of enamel and apparently never get carious. The gill plates make nice wine labels for decanters.

3. *The Black Mahseer.* I have only caught one fish of this variety, it was a very strong fish and took me all my time to land him ; it weighed 14 lbs. The colour was dark greenish-black, with beautiful orange lips. It had barbels and was broad and thick with very large scales and more carp- like than the Mahseer. I caught it on a spoon in very rapid water, amongst rocks and very large boulders, I imagine this fish is rare. It had the pharyngeal teeth.

4. There is a Mahseer found in the North Cachar rivers with yellow or yellowish-red fins ; in other respects it resembles true *Barbus tor.*

Food of the Mahseer. The Mahseer is omnivorous. He will take *atta* paste flavoured with garlic, also crabs, prawns, crickets, grasshoppers and fish of all kinds, but he prefers and pursues *Chilwa* relentlessly ; fruit, weeds and acorns are also eaten and they are very fond of the flowers of Kuchnar *(Bauhinia).* When these fall from the trees and float down stream they are snapped up by the Mahseer.

I have caught them by baiting a hook with the petals and letting the current take it down. A hook baited with the berries of a round fig-like fruit which Green pigeons are very fond of is very deadly. I think Mahseer feed on frogs and water rats. It is said they eat the fruit of the Strychnea tree *(Strychnos nux vomica)*. I imagine it only eats the fleshy outside rejecting the seed which contains almost all the deadly alkaloid. I do not know what it is but sometimes eating Mahseer produces distressing symptoms and once in camp every one of us went down. My wife, who ate very little, was the least affected but myself and servants were seized with alarming symptoms, colic, vomiting and a feeling as if someone was squeezing one's heart, almost producing collapse. It was a large fish which caused this and after that we only ate the smaller ones. The flesh of a Mahseer over 16 lbs. is not worth eating. Once in the Verati river in N. E. Manipur I saw Mahseer darting at and snapping up the yellow withered leaves of the *Bauhinia*. They were so occupied that they would not look at a spoon. The baits that are used to catch Mahseer are numerous and I will not enter into any great details. To my mind, nothing can beat the spoon, using it trolling from a boat or casting it. I cannot say which is the best spoon, sometimes a gold and silver at other times an all gold and silver will do execution. I have caught them on a copper one. Taken all round I think a gold and silver is the best and different sizes used according to the size of the fish present. I used a No. 10 for large and 2, 3 and 4 for smaller. No. 4 is a very good all round size. The $1\frac{1}{2}$" silver spoon, thrown like a fly, in very deadly for *Booka*. When casting a spoon there is nothing like the "Silex" Hardy reel. As regards spoons never have split rings but always solid ones, brazed treble hooks strongly made and wire mounts, not made of gimp, but twisted piano wire. I do not like gut mounts, as the gut gets frayed in no time ; it only does for the smaller spoons. I like Luscombe's hog-back spoons the best. It is surprising what strength

the Mahseer has to distort one's spoon and straighten out the hooks, so that everything must be of the strongest. I do not believe that the Mahseer does all this mischief by compression of his mouth but by rubbing it against rocks and I have actually seen one trying to get rid of a spoon in this manner. Don't have your spoons overpolished, rubbing with "Selvyt" cloth, before using in quite sufficient.

Why a Mahseer goes for a spoon is not exactly known. In some cases he, probably, mistakes it for a fish but generally, I think, the glistening and flashing arouses curiosity and anger and he dashes at it. I do not believe in weighting the spoons as this interferes with the spin. One can regulate the depth at which to spin by the speed of the boat and by raising or lowering the point of the rod. Of course spare mounts should be taken for all sizes of spoons and do not forget a pair of pliers and some fine strong wire and silk, also a bottle of varnish. I I prefer flying mounts, not trebles fixed to head and tail of spoon. A spoon with single hook at narrow end does well sometimes, as it does not interfere with the spinning of the spoon. Avoid thin spoons and flimsy hooks. The traces I used were Punjaub wire of various thicknesses (Hardy's) and I want nothing better. At first I used gimp but found it frayed and kinked. The traces should be well dried after use, and sunned and put into oiled paper, so that no rust can form. The attachment for the spoon in Hardy's traces is very good and easily and rapidly fixed. Punjaub wire can be used single or twisted double or treble ; it is also excellent for flying mounts.

The line is very important and get it of the very best. All the dressed lines deteriorate very quickly in the Indian climate so I always used an undressed one. The best is the "Kingfisher" brand, it is very strong and does not show much in the water. One hundred and fifty yards of this

spliced on to 50 yards of Khakhi hempen line is enough. This is put on to a 4½" "Silex" Hardy reel and can be used for trolling or casting. Hardy's preparation of "Ceroline" for preserving lines ought to be used occasionally as it prolongs the life of a line. Every day after returning from fishing reel off the wet line on to the back of a chair to dry and once a month reel off all the line and thoroughly clean and oil the reel. One will want a smaller reel and lighter line for *Chilwa* and other small fish.

Rods : I had two rods both by Hardy, one 11 feet and the other 9½ feet, in three pieces, with a spare trolling top. They were both steel split cane and were excellent and served me for years. I have had a steel split cane rod bend almost double and it still held. I know it is the fashion to dery steel split cane rods, but I put my faith in them. If they get crooked or out of alignment the makers can easily put this right. Never leave the rod longer in the sun than you can help and always take it to pieces at the end af the days' fishing and thoroughly dry it with a piece of clean "Selvyt" another thing is not to let grease of any sort touch the weoden parts or bindings of the rod, any grease at all salty ruins a rod. Always replace the wooden plugs in the holes of the rod and before putting it up use very little almond oil on the brass ferrules to prevent sticking. When dismantling the rod grasp the joint with hands on either side as close up as possible and then pull. Keep your rod hanging up when not in use, a reel of silk and a bottle of varnish are useful for renovating bindings I like spiral agate rings on my rod ; it is at these rings that the silk bindings are apt to give way. Sometimes on a very hot day great difficulty is experienced in taking the rod to pieces, don't use force but put the rod away and the parts will loosen in the cool. Look after your rod yourself I can assure you it is worth the trouble.

Besides the spoon there are many other baits used, lures, artificial prawns etc., but for clear water the spoon is best

and for dirty or coloured water. "Alligator tackle" mounted with a Chilwa is very deadly. Flies are, I know used, but in the Assam rivers I had no success with the "Blackamoor." Baits I have already alluded to both natural and artificial. The berries I alluded to were very deadly.

The best times to fish are between 9 a.m. and midday and then between 3 p.m. and sunset ; some days may be successful, others blank, it depends a good deal as to whether the fish are on the feed or not. I do not like a very bright day ; moderate sun, with a warm wind, is best. I always used a Khasia boat to fish from and when trolling sat on a broad-bottomed *morah* with a cushion on it. Dugouts are most uncomfortable and are generally very leaky. Never try to play a big Mahseer from a boat but always land. I have found the head of rapids the best spot for Mahseer. I always kept my boat some distance above them and let the current carry my spoon down. There might be a rush and away down the rapids would we go with the fish on until he stopped at the next pool. One's line often gets fouled on the rocks and snags and then there is a break and the fish is lost. The deep pools also hold good fish but one must spin deep. Always tell your boatman to paddle silently without a splash as the Mahseer is easily scared. Once when I was out with J. We struck a good pool, *Chilwa* were dashing all over it. I advised J. to get on shore as quickly as he could when he struck a fish but he ignored my advice and there he was shouting out "Major, what can I do with this fish" and with his rod bent under his boat on one side and the Mahseer on the other. I took the rod from him but the strain had been too much and pulled the hook out of the fish's mouth.

Very little is known about the migration of Mahseer but I know that, like the salmon, at the beginning of the first rains, when the rivers rose, they ascended into the higher

reaches to spawn. It is wonderful how they leap and get up the rapids and cataracts. When the rivers are falling, at the end of the rains, all fish descend to the warmer waters and the Mahseer have to follow. How the eggs hatch-out in the rushing waters where there is no sand I cannot understand.

A Mahseer's age can be roughly told by the number of rings on the largest scales, in the same way as the rings of a tree. I have counted 23 rings but Mahseer must live to 50 or 60 years as all the Carp family live long. Man is really the Mahseer's only enemy as everything else in the water is afraid of him though otters and birds prey on the smaller ones. If the rings are broken and rough in their continuity this shows bad condition ; but I have not noticed this as much as in Salmon's scales, when these fish get very much reduced, just before proceeding to the sea to recuperate.

I have found Mahseer, like other fish, are affected by tapeworm and I have caught fish with fungoid masses like tumours on them.

In Assam casting for Mahseer is done from a boat as the banks of the rivers there have cliffs and the jungle comes down to the water's edge.

Those who wish to acquire perfection in the delightful sport of casting a spoon should take lessons from an expert they will find it well worth while.

The next best fish to try for is the Baril or Indian Trout (*Barilius bola*). It is a very sporting fish rising to fly. When small they are caught with *Chilwa* flies, for larger ones a fly with a quill body and Florican hackle is deadly. Many of these fish swim together so that if you get one you are sure to get others. I once caught five running out of a rapid where two streams met. The largest I ever got was 3½ lbs. They fight well and jump right out of the water

when, of course, the rod point has to be lowered. The larger fish have a beautiful silvery-blue colour, the small fry are silvery with faint blue band markings. They are excellent eating.

(To be continued.)

The Trinomial system of Nomenclature examined.

As I can distinctly remember the great interest a bird, beast or insect aroused in my mind, even as a child, and the innumerable questions I used to ask my elders concerning its "proper name," habits, etc. I believe the taste for the study of natural history, together with a miscellaneous lot of less desirable characteristics, have been congenital in my case.

Up to my early days I was unable to definitely decide on my favourite branch of study in the field naturalists' line. First of all I took up beetles, then butterflies, then oology all claimed my fancy, but finally ornithology became my favourite hobby and the study of it enthralled me for many a year. When still in my teens I was fortunate enough to be thrown in the company of my brother the late Alex. M. P., than whom, a keener or more observant naturalist it would, indeed, be hard to find. Of course he possessed Oates and Blanford's volumes on Birds and we spent many a happy leisure hour collecting specimens and identifying them by this work. With its aid, and the exercise of a little patience and common sense, we never found any serious difficulty in identifying any of the specimens we obtained, and so pleasantly did the hours spent in collecting birds and their eggs pass, that I often thought that the man who wrote in the Koran "Allah be praised for the diversity of his creatures," must surely have been, like ourselves, a keen field naturalist.

One bird, in the case of which, we considered Oates had been guilty of hair-splitting was *Molpastes hæmorrhous*, but really all he had done was to show there was the typical *M. hæmorrhous* and five other distinct climatic and geographical variations of this same bird. To indicate, to the field naturalist, that this was so, he called them ail "Red-vented" and merely prefixed their approximate geographical area te "Red vented" such as Madras, Burmese, etc. That the "probable human error" is a factor that has to be allowed for in all works done by man is undisputable and Oates was only human. The question is :—Have those who have, with a view to improving on his work by altering the classification used by him, improved the facility of study and reference for the field and museum naturalists ? I consider, and I am sure there are many able field-naturalists who are of my opinion, but afraid to express their views in print, for fear of causing offence, that when the colour and size variations, in any species, are not of such a marked nature as to render its instant identification, when seen in its natural surroundings decidedly difficult, there is no need whatever to puzzle the naturalist by subdivision. Let us return to *Molpastes hæmorrhous*. I have seen it, in its wild state, from Darjeeling to Travancore and from Bombay to Sadiya and Burma, but the sight of one, in its natural surroundings, over any portion of that vast area never made me stare and say "That is no Red-vented Bulbul." To take another case *Corvus macrorhynchus* can any of my readers, who have travelled the length and breadth of India, truthfully say that any specimen of this bird seen by them anywhere made them believe that they had never seen it before or doubt its identity ? Yet in the new trinomial system how many sub species has this bird been divided into ? Let us suppose a dull field-naturalist, whose book of reference was Oates, living in the N. W. Frontier of India and being accustomed to the small form found there, transferred to Burma where the large form occurs. If the size of such should puzzle him somewhat,

a reference to the book would, in a very few minutes, assure him that is was not *Corvus frugilegus, cornix, splendens, insolens* or *umbrinus*. This leaves *corax, corone* and *macrorhynchus*. *Corax* he finds does not occur in Burma and *corone* is, apparently, confined to the region round Kashmir, so the bird must surely be *macrorhynchus*. On reading the description he finds the bird varies considerably in size and that those occurring in the area in which he is at present are on the large size and there his task ends.

But in the case of the present trinomial system having isolated it as a "Jungle Crow" he has yet to ascertain *which* of the four or more it can be. If he has shot a specimen well and good if he hasn't he must wait till he does so. Now with his specimen in hand he opens his book and his face lights up as he sees the one that is found in Burma and notes that it differs from the last in having the wing umpteen thingumy millimetres, etc. Out come his measuring instruments and the grin on his face alters to a frown when he finds his measurements are of a bird smaller than X Y Z and larger than W Y Z. Fortunately his pal Snooks lives at Prome which is the headquarters of the X Y Z type and is keen on helping faltering young ornithologists. The specimen is duly sent to him and in time the reply received. Alas for his hopes, Snooks who has carefully compared it with his large series of X Y Z is convinced that it can neither be X Y Z nor W Y Z but approaches the latter more closely than the former. He suggests that it should be sent to the British Museum at once for further examination. Now to run up against such snags cannot but dishearten those who intended to devote their spare time to the study of Natural History and I doubt not many have been discouraged thereby. The would be naturalist feels that to name his bid X Y Z is wrong as also to do so W Y Z, gets disgusted and thinks the whole thing is too much like making hard work of a hobby. Even in

dealing with one of the commonest birds he feels he has wasted his time and that some simpler recreation would be more pleasant.

Now it is by the encouragement of such would be field naturalists alone that the museum scientist can hope to receive series of specimens from which, by study and examination, he can accumulate and place on record, for posterity, scientific data. Any system that tends to damp instead of firing the ardour of the field-naturalists can only react adversely on the scientific study of the subject by curtailing the number of field-naturalists and consequently the amount of material sent in to the scientists for examination. Is there an alternative method of classification by which we can encourage the field naturalist to take a keen interest in his hobby without losing sight of the requirements of science? I think there is, A close study of all aspects of Natural History is certainly a desideratum, but is not the placing of the results, attained from such a study, before naturalists, whom force of circumstances prevents from studying the subject equally carefully but who nevertheless from their keen interest in the subject are entitled to be numbered as psendo-scientists, in the simplest, clearest and most interesting form equally desirable?

Can any system that, however well meant, complicates matters for those whose study of the subject must, perforce, be confined to their leisure hours, be said to contain the essential elements of simplicity, clarity and interest? Assuredly not.

The imaginary case mentioned of Snook's friend is, I happen to know, not only not improbable, but actually exercising the mind of a certain naturalist.

The next and pertinent question is. Is there any system of nomenclature that would, whilst retaining the present

high standard of minute detail, owing to its greater simplicity, clarity and interest, appeal more strongly to the field-naturalist ? I say " yes ".

Many of my readers, many is, perhaps, too optimistic a term to be employed by an obscure field naturalist, doubtless consider that to attempt to alter or improve on the work that is being so ably carried out by our leading ormithologists were mere folly. It is because those whose mentality is of "slave" type are in the majority that improvement is not as rapid as might be. Such persons, and as I say they are in the majority, are prepared to change from one system to another without hesitation or thought provided the auther of the "latest" system is a leading scientist on the subject. If asked why they have changed so readily the reply invariably uttered is "because I want to move with the times and be up to date." In a different sphere the same mentality results in men wearing apparel in which they look and, doubtless, feel, though they wont admit it, guys. In the case of Oxford bags and such absurdities the wearer may be able to claim, with some truth, that they afford a modium of comfort. I fear the promising ornithologist, who is placed in the position of Snooks' friend, cannot claim that the trinomial system has afforded him even this.

I would mention here that I hold myself second to none in a proper appreciation of the selfless work done in the past and at present by scientists to further the knowledge of the various subjects they have dealt with. Our debt to these able men is incalculable as by their ungrudging labour alone, often undertaken under very trying conditions, has the valuable knowledge, contained in the literature available on these subjects been accumulated.

No progress in knowledge can be gained without a great deal of hard work and careful and unbiased examination. If the result of such examination be constructive criticism, even though it comes from an obscure and little

known person, then the author of such criticism is working on the right lines and the criticised should feel, if he is sensible, that the system advocated by him has done some good in that it has created sufficient interest in students of the subject to wake them into using their brains.

At the present time, thanks to the advocates of the trinomial system, considerable knowledge has been gained of the climatic and geographical variations in species. The result of the labours of such scientists is a mass of literature of great value in respect to the minute details entered into but which from the large number of subspecies into which one or more of those of the previous standard work on the Indian avifauna have been split, fairly damps the enthusiasm of the average field-naturalist.

It is a well known and established fact, that the fauna of desert areas are lighter in colour than those of the same species inhabiting forested areas of heavy rainfall; that in India the same species often varies considerably in size between its Northern and Southern limits, the smallest occurring in the South that, when the area covered by a species represents considerable geographical extent, it will be found to vary much in accordance with climatic conditions appertaining in various parts of the said area; that, between the area inhabited by two varieties of the same species, there will be found a number that are intermediate. Evolution, by natural selection, will, doubtless, in the course of time, eradicate some and alter others of these variations, but having noted their occurrence, and the area in which they are found, we have done our duty to posterity.

The best method to increase the appeal to the average man, keen on the study of any branch of Natural History, seems to me to be easiest accomplished by simplifying the nomenclature used in our standard works, whilst retaining all the valuable information gathered to date.

As we wish to make full use of our knowledge of the variations of each species the use of black and white maps would be of greatest value. I would propose to revert to the binomial system as being less confusing to the field naturalist than the present trinomial system. Let us imagine a specimen page from such a work, and take a bird with marked variations such as *Corvus splendens*. The description would of course be of the type specimen, by which it would be understood that this was the form prevalent over the greatest portion, of the area in which it occurs. Should the bird have been originally described from a locality outside this area, this could be mentioned such as described by so and so from a specimen collected at such and such a place.

First of all the name of the bird (binomially) would be given thus **Corvus splendens.**

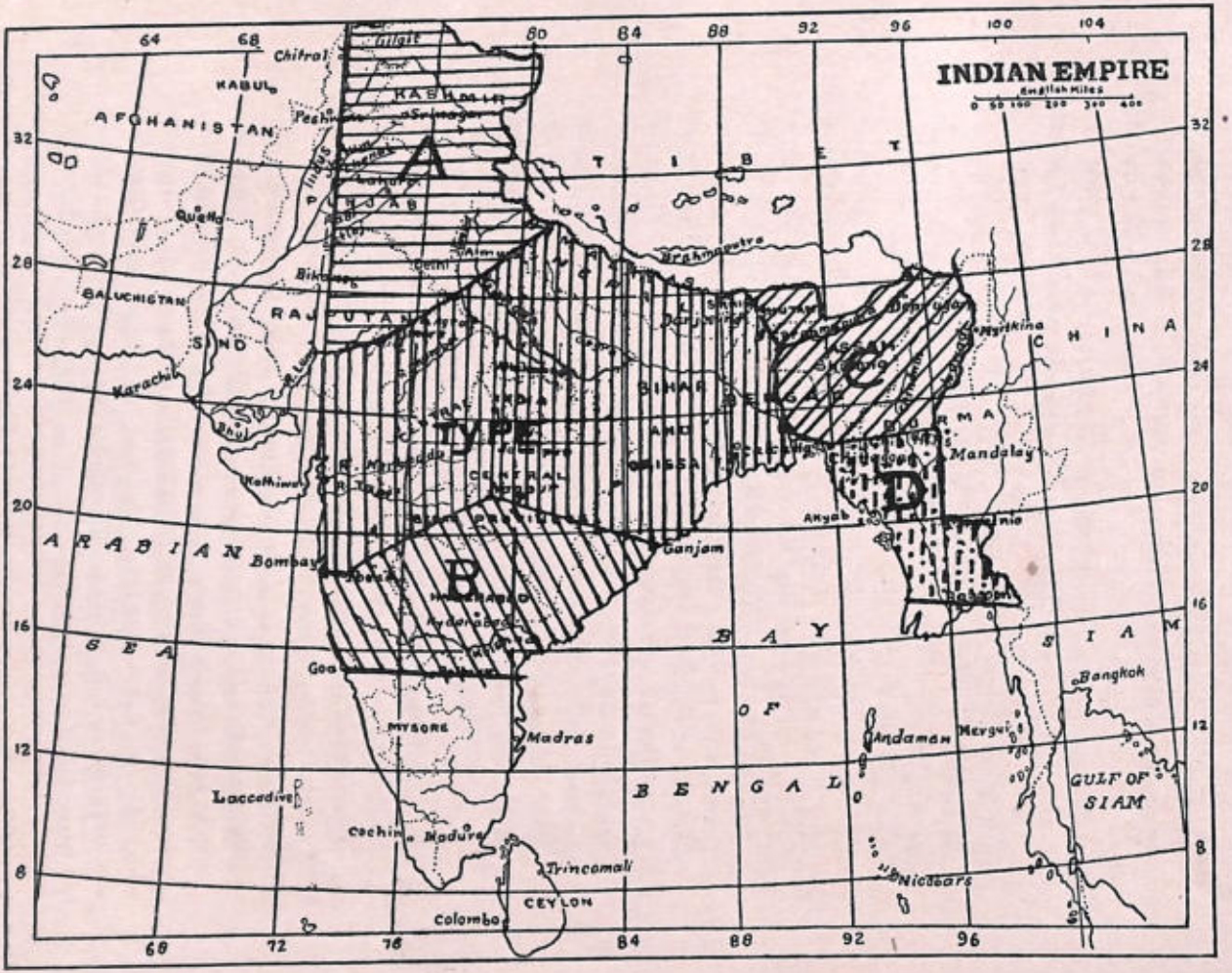
Then description of type specimen.

Then description of distinct and marked variations.

A.
B.
C.
D.

Then would come the habits. Although many naturalists have given us notes on the habits yet there is a vast amount still to be learnt about even our commonest birds; of late years we seem to have learnt more about colour and size variations than about habits. Then the habitat would be shown on the map. The unmarked area being that in which the bird does not occur, the other portions of the map will be so marked as to show at a glance the areas in which the typical and subspecific forms are found.

Even those who have become wedded to the trinomial system are able to see where, what they are pleased to call


INDIAN EMPIRE
English Miles
0 50 100 200 300 400
A
B
C
D
Type
AFGHANISTAN
KABUL
Chitral
Gilgit
KASHMIR
Srinagar
Peshawar
PUNJAB
Quetta
BALUCHISTAN
SIND
RAJPUTANA
Karachi
Bhuj
Kathiawar
Bikaner
Delhi
Almora
Nepal
TIBET
Brahmaputra
CHINA
Myitkina
Mandalay
Akyab
Ganjam
Goa
Bombay
ARABIAN SEA
BAY OF BENGAL
Madras
MYSORE
Laccadive
Cochin
Madura
Trincomali
CEYLON
Colombo
Andaman
Nicobars
Mergui
Bangkok
SIAM
GULF OF SIAM
64
68
72
76
80
84
88
92
96
100
104
32
28
24
20
16
12
8

Corvus splendens splendens and *Corvus splendens* something else occur and if they like to continue to retain a trinomial complex, they can do so.

In the case of species confined to certain areas, and having no marked variation, a map would not be necessary.

Mr. E. C. Stuart Baker in an article in defence of the trinomial system deprecates the indiscriminate creation of species citing as an example the case of *Corvus splendens* and *insolens* and claiming, and quite rightly, that the last is merely a local colour variation of the former. Yet whilst it is wrong to call them separate species although they are very different even to the unaided eye there is, apparently, no limit to the number of *sub* species that an ornithologist, with the aid of a millimetre scale and a pair of compasses, may *rightly* create. If *insolens* is not entitled to specific separation then why not simplify matters by noting it as variation B or C of *Corvus splendens* in the letter press instead of describing it separately as *Corvus splendens insolens* and to show its distribution on the map. This way will encourage the average naturalist to take a keener interest in the study of Natural history in its different branches.

I feel certain that a return to the binomial system, or a similar or better one that some more able person than myself may evolve, would be welcomed heartily by those who, for the nonce, claim to be ardent trinomialists.

Personally such a revision would not only enable me to believe that Allah should be praised for the diversity of his creatures but would cause me voluntarily to add, Alil Allah. I trust that this article will meet with the approval of some and with the opposition of others and that, as a result, the wiser men of either party may have something to offer for the good of science in general and field naturalists in particular.

C. PRIMROSE.

[We would also like to impress on our fellow naturalists to study the *birds* or whatever else they are interested in rather than their *dry skins*. As Mr. Primrose says there is still a vast amount to be learnt about even our commonest species. In this connection we quote a few lines written by that able world-known naturalist the Rev. F. C. R. Jourdain in a most interesting article on "A study on Parasitism in the Cuckoos." *(Proceedings of the Zoological Society of London 1925 pp. 639 to 667).* He first of all quotes R. Ridgway, who, in the *"Birds of North and Middle America,"* writes :—"There are two essentially different kinds of ornithology ; systematic or scientific, and popular. The former deals with the structure and classification of birds, their synonymies and technical descriptions. The latter treats of their habits, songs, nesting and other facts pertaining to their life-histories.....But systematic ornithology being a component part of biology—the science of life—is the more instructive and therefore more important". Then Jourdain writes :—"It represents with perhaps more frankness than usual what most anatomists and taxonomists feel with regard to the study of other aspects of Bird Life, and discloses some of the weaknesses of present day ornithology. For at the present time there is too great a tendency to work in" water-tight compartments," if one may be allowed to use such a term. The Comparative Anatomist has no knowledge of the bird in life, although every structural development must be closely related to the life-habits of the animals ; serious work on classification and nomenclature can only be carried on by specialists in our great museums where vast series of skins are available for comparison and extensive libraries are at hand ; so that it tends to become more and more the preserve of a close corporation, who regard the naming of subspecific forms as the aim and end of all ornithology, and spend their time in immortalizing one another. All are, however, agreed on one point, and that is the somewhat contemptuous toleration with which all

other branches of "Popular" ornithology are regarded. The study of the life-history of the bird from the egg to its death, its social ceremonies, its breeding-habits, its migrations, its distribution—these are comparatively trivial matters which can be left to the egg collector, the bird photographer, and the bird watcher. Yet a wider and less narrow-minded view of the whole field may induce some qualms as to whether there may not be something to be said on the other side. Possibly the man who by weeks of patient field-work establishes beyond cavil some new law in the history of a species is after all doing quite as good work as a man who pulls out a drawer with 100 skins in it, and after spending an hour or two in arranging them geographically, finds that the northern birds have a slightly yellower tinge on the mantle (invisible of course by artificial light, but perceptible in about 70 per cent., of the specimens by bright daylight)".

[*Editor.*]

The Blue-breasted or Painted Quail.

With regard to this Quail in the Duars, Sir Lancelot Travers writes to me as follows :—"I think this Quail is resident here all the year. One does not see it in the tea as much as the Bustard and Button Quails. Patches of grass near cultivation or on the edge of a thin thatch *barri* are favourite places."

Editor.

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The Society was started about the end of 1923, the objects being to maintain the Museum in a proper condition; to promote the study of Natural History and to get together, as complete as possible, collections of Natural History specimens from a limited area, including "the civil districts of Jalpaiguri and Darjeeling and the State of Sikkim", as well as what could be procured from the neighbouring countries of Tibet, Bhutan and Nepal.

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Vol. VIII. No. 3.

Game Birds of Sikkim, including the Darjeeling District, and of the Jalpaiguri District, Bengal.

By

C. M. INGLIS, F.Z.S., F.E.S., E.M.B.O.U.

(Continued from page 62).

(36) The Black-breasted or Rain-Quail.

Coturnix coromandelica (Gmelin).

This is a smaller and handsomer bird than the Common Quail.

The cock has the upper plumage very similar to that of the Common Quail but generally richer in colour. The primary quills, however, have *nobars* on the outer webs. He has the same anchor-shaped mark on the throat but this is much darker, being almost black, and the rest of the throat is pure white. The sides of the breast and flanks are warm vinous-buff, with broad black stripes, the amount of black on the breast increasing with age, old birds having the whole breast of that colour.

The bill is black in the breeding season and yellowish-brown, bluish below, at other times of the year. The iris is brown and the legs are pale fleshy to yellowish-fleshy.

The length is 6·25 to about 7 inches, the wing 3·25 to 3·60 inches and the tail about $1\frac{1}{4}$ inches. The weight varies from 2 to 3 ozs.

The hen is very like that of the Common Quail but can easily be recognized by the primary quills having *nobars* and by her smaller size. The colour too is generally richer in tone and the spots on the breast rather smaller.

The colours of the soft parts and measurements are about the same in both sexes.

The distribution, as given by Stuart Baker, is "Practically throughout Ceylon where it is rare, India and Burma to the Shan States. Obtained at Simla, 7,000 ft., by Dodsworth."

There is nothing very definite about its status in our area. Stevens says it "has been reported to have been obtained in the Rummam Valley where it may possibly be resident to some extent." Masson wrote in his "*Game Birds of Darjeeling*," "I have frequently shot these birds in the rains but never saw more than one at a time. Latterly, down in the valleys, I have started five or six together, and last February I shot two on the banks of the Ramam." Travers tells me he shot one at Baintguri in the Duars, many years ago but has never seen any of late years. On the 6th July 1933 he wrote to be:—"In my notes I wrote I had seen the B. B. Quail in January, February and March."

This Quail is more or less locally migratory, often absent in places in the cold weather where it is common in the rains. Davidson assumes these wanderings are due to its search for food, water and shelter and is, no doubt, correct.

They are met with singly in the cold weather and in pairs from April to October. When the young are able to fly and until they are about 8 months old coveys may be seen but otherwise, even where most plentiful, each bird acts independently.

In general habits they resemble the Common Quail but are more often met with in grass and less in crops than the latter bird; they will also take to scrub jungle during the hotter months. Sometimes they enter compounds, where there is any longish grass and come out in the mornings and evenings to pick up food along the paths.

Their chief food appears to be grass-seeds, but grain and insects are also eaten.

Their flight is very similar to that of the Common Quail and, except for its smaller size, it is nearly impossible to tell it from that bird. Hume writing about it from a sporting point of view says:—"Rain Quail afford just as pretty shooting as the Common Quail when they are numerous; indeed as they run less and fly rather faster, they yield perhaps better sport; but I have never known it possible to make such huge bags of these as one can of the other. In Upper India, during the winter and spring, you are pretty sure to pick up a brace or two along with the Grey Quail (with which they seem to associate on friendly terms) when shooting this latter; but I never knew more than five brace killed at this season in a day by one gun. But just when they first appear in the Doab in June or July, according as the rains are early or late, you may manage by hard work to get from twenty to thirty brace in a day if you have steady dogs and there is plenty of grass about from two to three feet in height, or if, as in the case in some districts, there are a good many fields of the dwarf early rain millets."

This Quail is not supposed to be as good for the table as the Common Quail but we have found little difference except that tht latter is generally fatter.

The call of the Black-breasted Quail is a musical quickly repeated *whit—whit—whit—whit*.

This Quail is certainly monogamous being always seen in pairs from April and when the hen is sitting the cock is contnually calling to her.

The Black-breasted Quail breeds during the rains. The nest is a depression in the ground, either natural or made by the bird itself, and is usually lined with a little grass. It is generally placed in standing crops or thin grass of moderate height but even sometimes in the open.

They lay from 4 to 11 eggs which are similar to those of the Common Quail but smaller, averaging about 1·09 × 0·83 inches.

This Quail does well in captivity even in the English climate. Mr. Seth Smith who kept it at home considered it a very charming bird for a well turfed aviary. This bird soon got tame and bred freely, usually rearing two broods in the year. He gives the incubation period as from sixteen to eighteen days.

One of these birds kept in the rooms of the Bombay Natural History Society lived for about or over seven years.

We now come to the last of the true Quails the genus *Cryptoplectron* which is confined to India. The tail has 10 feathers; the wing is short and rounded and the leg has no spur. There are only two species, each with a subspecies; one subspecies occurs in our area.

(37) Primrose's Bush-Quail.

Cryptoplectron manipurensis inglisi (Ogilvie-Grant.)

The adult cock has the forehead, round the eye, cheeks, chin and throat chestnut; in front of and behind the eye white; ear-coverts brown. The rest of the upper plumage is grey narrowly barred with black, the bars on the lower back and rump being mostly confined to the basal half of the feathers; some of the scapulars are more boldly barred, the bars more or less confluent forming irregular blotches; the wings are brown, the innermost feathers barred with darker

brown. The neck and upper breast are grey with faint blackish shaft-streaks; the rest of the lower plumage is pale rufous-buff, rather deeper on the centre of the breast, each feather with black markings forming a cross with a broad cross-bar. The under tail-coverts are black spotted and tipped with white.

The bill is dark grey, the base of the mandible lighter and in some specimens this is tinged with yellow, the iris is brown and the legs are orange-red, the back of same and the toes lighter; the claws are light brown.

The length is about 6½ inches with a wing 3·4 inches and tail 2 inches.

Immature cocks resemble the hen but show a few chestnut feathers on the chin and throat.

The hen resembles the cock but has no chestnut on the head and the mantle is merely margined with black. The lower plumage is much paler being buff instead of rufous-buff.

We did not weigh any of our birds but as they are the same size as the typical race the weight will probably be the same. Stuart Baker gives this as 2·28 to 2·65 ozs. in cocks and 2·37 to 2·94 in hens.

The chick has the centre and sides of the crown rufous the rest being deep brown: there is a streak from base of the bill over each eye; another from the base of the bill under each eye to the ear-coverts and one from the gape below the ear-coverts, dark brown; the region round the eye is yellowish-white. The upper plumage is rufous-brown, the feathers sub-terminally banded with deep brown and tipped with rufous, the shaft-streaks are whitish; the scapulars and wing-coverts are deep brown with broad rufous edges. The flight feathers are brown, the inner webs banded outwardly with rufous. The chin, throat and abdomen are whitish and the breast and flanks mixed dark brown and rufous.

The bill, except base of upper and tip of lower mandibles, is dark greyish, the remainder is albescent; the iris is brown and the legs fleshy, the back of the tarsus and the toes being yellower.

The distribution as given by Stuart Baker is "The foot-hills and adjoining plains of the Eastern Dooars, Jalpaiguri and Assam, East to Sadiya." The only actual specimen secured in the Duars was at Alipur-Duar but Primrose, who knew the bird well in Goalpara, saw it not far from the Torsa river and Shebbeare believes he has seen it.

There is very little recorded about this handsome little Quail, the sum total being a short note by Lt. Col. Thornhill and a longer one by myself. The former got it at Alipur-Duar in the cold weather of 1885-86, but it was only on my sending home specimens from Goalpara to the British Museum that this skin was properly identified. Lt. Col. Thornhill wrote as follows:—

"On more than one occasion I put up a couple of Quail when tracking tiger in long grass, and realized that they were new to me. The male was a lovely little bird, resembling a miniature black partridge it seemed to me, and both birds had a habit of flinging themselves headlong into the tall grass, in an apparently reckless manner, possibly with the object of forcing a way to the ground through the grass. After I had got the tiger I went after the Quail. I missed the male but dropped the hen bird. I could not get the cock to rise again and feared I had wounded him.

The birds lived within a mile or so of the Rest House, and were found in the long grass to the north-east of the Sub-Divisional Officer's house.....I imagine they are (or were) regular visitors to these quiet haunts and are probably spread over various parts of the Duars." (*Jour. Bom. Nat. Hist. Soc. Vol. XV p. 527*).

The type specimens were got by Primrose and myself in Goalpara, Assam and the note I wrote about these birds is:—

"Whilst staying with my friend Mr. A. M. Primrose at Mornai Tea Estate in the Goalpara District of Assam, I had several opportunities of studying these birds and the following notes are compiled from my own observations and also from those of Mr. Primrose who kindly allowed me to use his notes. We identified the bird as Humes' Bush-Quail, but on my sending a sketch home Mr. Ogilvie-Grant said he expected it was a new species, and on my sending a series of skins they confirmed his opinion and he has paid me the compliment of naming it after me.

This Quail is, if anything, the commonest quail got in that garden, but, on account of the nature of the jungle it frequents, it is seldom seen and difficult to get. They are found in damp, dense ekra jungle which grows in the nullahs and when these get inundated during the rains they move into higher pieces of ekra and also into the sungrass. We have never seen them on absolutely dry ground except when feeding, at other times they keep exclusively to the damp nullahs. Our observations are mainly confined to the cold weather and up to April as after that the jungle is too heavy to walk through or have beaten. They are excessively local birds, only certain patches of jungle holding them and they frequent the same spot year after year. Although there may be, what appears to us, identical patches of ekra in the same nullahs and which one would think should contain the quail, still none will be found in them. One very soon gets to know which patches are worth beating and which not. Many of these birds must get destroyed in the fierce grass fires which rage in that part of Assam during the early part of the year. A good method of getting these birds is as follows:—

A day or two before the beat takes place, burn patches in the nullah leaving those which contain the birds. This has to be done carefully. This thinning of the jungle gives one a

better chance, as it leaves the birds fewer spots to put up in when flushed and also fewer wounded birds get lost. Without doing this it is very difficult indeed to retrieve wounded birds as they run a lot and have a knack of getting over the ground at a good pace. A good dog or two would of course be of great service both for retrieving and putting up the birds. Burning the grass in front of one as one goes along is no use as the birds only run before or else through the fire and will not take to flight. They are usually seen in covies of four to six, but during March and April they get into larger ones containing from six to twelve birds or perhaps even more. On the 28th March, Mr. Primrose wrote that they were *exceedingly plentiful* and that he picked up four during one evening's stroll. He had hopes of obtaining the eggs but up to date they are still *desiderata*. The covies separate on being disturbed, some birds flying on ahead and others back over the beaters. They are not difficult to flush a second or even a third time with a sufficient quantity of good beaters. At first they rise straight up in the air and they go off with a straight, steady flight for about fifty yards and then drop suddenly. This habit they have of dropping suddenly, often makes one believe that one has missed one's bird instead of which it is probably stone dead where it fell and also *vice versa*. On touching the ground they either start running at once or else, if the beaters are close up, they will squat. It is most difficult to spot them either running over or squatting upon the burnt grass for their colour matches that of the ash most perfectly. When they squat they sit very closely being sometimes picked up alive by the beaters. Their note is like that of the Painted Bush-Quail (*Microperdix erythrorhynchus*) and is often uttered when the covey separates. As far as we could observe males outnumbered females. Their food consists principally of seed. They very occasionally, are flushed from the edge of the tea. We, on several occasions, came across covies feeding in the open on the burnt ground up to about mid-day and probably during dull weather they feed there all day. With fair luck and straight powder, two men, one taking each side of the

nullah, ought to be able to account for every bird in it. Our biggest bag for a morning was eight birds, but that, I am certain, could easily be beaten in a place like Mornai. They are known by the name of '*Kala goondri*' at Mornai Tea Estate, where all our specimens were obtained. Adults showed signs of breeding in the beginning of March and we were fortunate enough in obtaining a fully fledged young one on the 11th of January." (*Jour. Bom. Nat. Hist. Soc. Vol. XIX pp. 1 to 3 with a coloured plate.*)

The few of these Quail which we, with great reluctance, allowed to go to the pot were excellent eating.

The nidification of this Quail still remains unknown but it is not likely to differ much from that of the typical race the Manipur Bush-Quail (*Cryptoplectron manipurensis manipurensis*) which was found breeding by Stuart Baker. He writes:—"On the 13th May I found a nest containing four eggs in some thin grass, not more than a couple of feet high on a grass-covered hill in North Cachar, shooting the hen bird off it. The nest was merely a hollow among the roots of the grass, lined with a little grass. The eggs are indistinguishable from those of other *Cryptoplectron* but are purer white than most; they measure 30·4 × 24·1, 31·2 × 23·5, 31·2 × 24·0 and 29·3 × 24·9 mm." The eggs of the Painted Bush-Quail which are the best known are described by Hume as being "long ovals, pointed towards the small end, somewhat glossy, spotless and of a uniform, often very pale, *café au-lait colour*."

To be continued.

Our Laughing-Thrushes of the genus *Dryonastes*.

By

C. M. Inglis, F.Z.S., F.E.S., E.M.B.O.U.

The Laughing-Thrushes belong to the very large family *Timaliidæ* which has three sub-families, the *Timaliinæ*,

to which the Laughing-Thrushes and Babblers belong; the *Sibiinæ*, consisting of the Sibias, Bar-wings, Staphidas, Sivas, Yuhinas, Ixulus and Erpornis, and the *Liotrichinæ*, containing Liothrix, Cutia, the Shrike-Babblers, Ioras, Myzornis, Chloropsis, Mesia, Minla and Hypocolius.

The Laughing-Thrushes are divided into five genera, *Dryonastes, Garrulax, Ianthocincla, Trochalopteron, Grammatoptila and Statocichla* all of which, except *Statocichla*, are represented in our area.

The genus *Dryonastes* consists of eight species and subspecies but only two are found in our area. They are easily recognized.

1. The Rufous-necked Laughing-Thrush.

Dryonastes ruficollis (Jard. and Selby).

(With a coloured plate.)

Field identification:—An olive-brown looking bird with most of the head and breast black and with bright chestnut patches on the sides of the neck, lower abdomen and under tail coverts. Seen and *heard* in small or large parties in scrub, bamboos, long grass, etc., from the *plains* up to as high as *5,400 ft.* They keep up a continual chattering and shrieking.

Description:—Length about 10 inches; wing 4 inches and tail $4\frac{1}{2}$ inches.

Top of the head slatey-grey, the rest of it, the chin and upper breast black. Rest of plumage olive-brown except the sides of the neck, lower abdomen and under tail-coverts which are bright chestnut. Sexes alike.

Bill black; legs livid brown; iris bright red. *Distribution*:—Very common in the Duars and in the hills up to *4,550 ft.*; but we have also seen it as high as *5,400 ft.* at Rinchenpong in Sikkim. It is a resident bird.

Outside our area:—Eastern Nepal, through Assam, North and South of the Brahmaputra, Manipur, Lushai, Tippera and Chittagong Hill Tracts, and Bhamo and the Upper Chindwin." (*Stuart Baker*).

Habits, etc.:—A very gregarious bird, as are all the Laughing-Thrushes, going about in parties of from half a dozen up to thirty or so. They inhabit thick scrub, often near villages, bamboos and long grass and keep up a veritable babel of chatterings, shrieks and laughs. They are not shy birds though not seen as often as they are heard. They feed a good deal on the ground, their food consisting of insects, seeds and also fruit. According to Buchanan Hamilton they are easily tamed and sing like a Blackbird!!

With regard to their nidification Stuart Baker says "In Sikkim they breed mainly in May but in Assam they seem to be breeding almost equally all through April, May and early June and I have taken eggs from the middle of March to the middle of August." A nest taken by Mr. Matthews at Namring, 3,000 ft., was found on the 2nd May "in coarse grass land, 4 ft. from the ground, in a clump of thick grass stems growing round a bush". Both Mandelli and Gammie took many nests up to about 4,500 ft. elevation. They were mostly "found in scrubby jungle fixed in bushes, within five or six feet of the ground." He also took two from bramble bushes. Stuart Baker says they breed in all kinds of cover but that, above everything, they "love scrub, secondary growth in deserted cultivation or mixed scrub in bamboo-jungle." He has, however, found nests "built in the deepest parts of humid, evergreen forest." The nests found by Mandelli and Gammie were "deep or rather compact cups, varying from 5 to 6 inches in external diameter, and 3·25 to 3·75 in height; the cavities about 3·25 in diameter and 2·25 in depth. The nest is composed almost entirely of dry bamboo-leaves bound together loosely with stems of creepers or roots, and the cavity is lined with black and brown rootlets, generally not very fine." The portion of the nest sent to us by Mr. Matthews is a very

compact cup. Stuart Baker says that most of the nests he has found have been "rather untidy exteriorly." The eggs number three or four, they are very glossy and very pale skim-milk blue in colour "very rarely pure white or almost so, equally rarely a rather darker blue." (*Stuart Baker*). They average 1·02 by 0·75 inches.

The coloured plate shows the bird on *Lantana* scrub.

2. The Grey-sided Laughing-Thrush.

Dryonastes cærulatus cærulatus (Hodgson).

Field identification:—A medium sized bird only found in the hills from *2,000* to about *6,000 ft*. It is rufous-brown above and white below with grey sides. Seen in parties of half a dozen frequenting undergrowth in forest and making the usual noisy chatter of all Laughing-Thrushes.

Description:—Length about 11 inches; wing 4·2 inches and tail 4·8 inches.

Upper plumage rufous-brown with narrow black edges to the feathers on the crown; forehead, round the eyes, top of cheeks and ear-coverts, and point of chin black; rest of ear-coverts mostly white. Lower plumage white with the flanks grey. Sexes alike.

Bill horny black; legs pale fleshy; iris red or red-brown.

Distribution:—In the hills only from about *2,000 ft*., where O'Donel procured it at Buxa, up to about *6,000 ft*. Stuart Baker says Stevens found it breeding at *9,000 ft*. but this is not mentioned in his "*Notes on the Birds of the Sikkim Himalayas*."

Outside our area:—"Nepal, hills North of the Brahmaputra and hill-ranges of North Manipur, Naga Hills to Dibrugarh." (*Stuart Baker*).

Habits, etc.:—The habits are much the same as those of the last species. It is found in undergrowth in forests and bamboos. We have never come across them in as large parties as the Rufous-necked Laughing-Thrush and they are not quite as noisy.

The breeding season appears to be May and June but a nest was taken, in Sikkim in July. Gammie took nests in the Cinchona Reserve at Mangpu at elevations between 3,500 and 5,000 feet. The nests "were always in forests with a more or less dense undergrowth. The nest is placed in trees at heights of from 6 to 12 feet from the ground, between and firmly attached to several slender upright shoots. It is cup-shaped, normally rather shallow, composed of dry bamboo-leaves and twigs and lined with root fibres. One I measured was 5 inches in diameter by 2·5 in height exteriorly; the cavity was 4 inches across and only 1·3 deep. Of course they vary slightly. As far as my experience goes they do not lay more than three eggs, indeed, at times only two." Another nest was placed in small bamboos and "composed externally entirely of dry bamboo-leaves loosely tied together by a few creepers and a little vegetable fibre and lined pretty thickly with fine black fibrous roots." Stuart Baker mentions Otto Möller having taken two nests in the Cinchona Plantations, they were placed 5 and 10 feet from the ground. The same author also says Stevens found "it breeding in Native Sikkim at 9,000." Hume describes the eggs as "a beautiful clear, rather pale, greenish blue." They average 1·18 by 0·82 inches.

The Indian Plantive Cuckoo.

(Cacomantis merulinus passerinus).

Picture a dark greyish bird, about the size of a bulbul, with dirty yellow legs and red eyes, and you will envisage a casual description of this most unattractive bird. Seemingly aware of its plain plumage it will thrust itself upon your notice

complaining the while in plaintive tones. The call, which is a mournful cry, is most unmusical, but not so far as concerns the bird, for, perched conspicuously on the branch of a tree, it will call persistently and to a degree of irritation to those who, perforce, must listen!

Its unattractive appearance and unmusical call has not passed without recognition from the hill folk, for unto it have they assigned the name "Suby", whereby hangs a tale which is in keeping with its sombre colouring and profuse lamentations. The story, which is legendary, depicts a woman fording a stream with her baby on her back when she slipped, thereby dropping the infant who was immediately carried away by the relentless torrent.

Overcome with grief and depair at the loss of her child, the mother threw herself into the stream where she also found a watery grave. Subsequently, the mother was reborn as a Plaintive Cuckoo and is now forever calling out in mournful tones the name of her lost child which was "Suby". Towards the end of August this bird commences to lose its voice, and the noise then emitted would lead one to imagine that it was suffering from a severe cold; this, also has its allegory with the hill people who say that it was in August when the unfortunate mother lost her child, so that, after having called incessantly for months, the cracking of the voice is merely symbolic of the terrible memories which that month conjures up for the grief stricken mother!

Although this bird is supposed to live on an entirely insectivorous diet, I have seen it eating berries off a tree.

T. A. BALDRY,

Tumsong T. E.

Bears and their Shikar.

By

Colonel H. S. Word, I.M.S.

My remarks apply to Bears as observed in the Province of Assam. The only other place I have been after them was in the Forest Reserve opposite Darjeeling.

There are three kinds of Bears in Assam. I. The Himalayan Black Bear. 2. The Sloth Bear. 3. The Malay or Sun Bear.

1. The Himalayan Black Bear.

The Hindi name is *Bhalu;* Nepalese *Reech*, Manipuri *Sowom* and the Kuki *Wumpee.*

This Bear is not as common as the Sloth Bear in Assam. There were a great number beyond Manipur, between that State and the Naga Hills. They were common in the Haflong district of the North Cachar Hills and I have also seen them in the jungles in the Tezpur District at the foot of the Bhutan ranges. They are common in the Himalayas.

This Bear prefers mountainous and hilly country but I have come across them in the plains where, apparently, they had wandered in search of food. It is, essentially, a lover of forest where it can find plenty of fruit, honey, etc. Some of the places they inhabit are truly terrible for the sportsman who tracks them up consisting of rocky nullahs, roaring torrents, ravines covered with dense undergrowth, and *pathiboi*, a kind of thorny acacia. It can truthfully be said that a Bear will face *any* jungle its hide seems impervious and non-sensitive to thorns or bee stings. It can travel fast over the rockiest and steepest ground and is equally at home in a tree, any of which he can scale with ease. It is astonishing the way it can balance itself and turn and twist on a branch which one cannot conceive would bear its weight.

It can dig like a miner with its powerful claws and will spend a whole night digging out juicy morsels such as the fat grub of the big scarab beetle, or the queen of a termites nest, etc. They are quite handy with their teeth though these are seldom used as weapons of offence, for this purpose its powerful claws are used. It will spend days gnawing away the wood, round a hole in a tree to get at a bees nest oblivious of the attacks and stings of the angered insects. I have come across such gnawings in all stages. While the animal is engaged at this operation it makes a curious, musical mumbling noise, which can be heard from a considerable distance. It is a sound indicating pleasure and is also made, sometimes, when the animal is at rest and it then places the pad of its paw in its mouth and emits this sound. During the operation there are deep inspirations and excessive salivation. I once had a tame Bear and by applying butter to its paw it would produce this noise; it closed its eyes and its whole appearance denoted extreme pleasure. I asked my shikari why Bears made this noise and he said it reminded them of the hum of bees in a hive and that they imagined they were rifling it, when one analyses the sound one can be led to believe that there may be something in this theory but I am inclined to think it is just a sign of pleasure equivalent to the purring of a cat.

All Bears are nocturnal animals and do most of their feeding at night. Their eyes are very small for the size of the animal and their eyesight is very poor. With exposure to the sun the eyes soon get affected with cataract and opacity of the cornea; readers of the Journal must have noticed how often this is the case in Bears in Zoos. The sense of hearing is very poor too but that of smell is very acute enabling them to locate some joicy morsel or root far below the surface of the ground.

Just as the sun is setting or soon after, Bruin emerges for his night of wandering and will cover many miles in quest of food returning at the first streak of down to pass the day

in sleep, either in a cave, a fork of a tree or on a specially built *machan* in a tree top. It is an omnivorous animal, its chief food being fruit, honey and grubs; various wild fruits are consumed such as that of the Jamun, ber and medlars; the berries of the wild figs are greedily devoured and this particular Bear is very fond of acorns, on which diet it waxes fat in the autumn, preparatory to hibernating. Bears levy heavy toll on the villagers' crops especially on the *makai* or Indian corn. This usually is during the rains when this crop ripens and often the villagers will appeal to one to shoot the marauder. It is weary and unhealthy work. I once tried this form of shikar but never again; one generally goes down with a dose of malaria after doing so. Bears will also eat carrion, once, while after pheasants in the *khuds* at the back of Landour near Mussoorie, I came across a Bear feeding on a dead pony. The food they like most of all is honey, scarab larvæ and termites and wasps. In places where Bear are found one comes across deep pyramidal shaped holes which they have dug. After the annual forest fires the roasted tree ants' nests and their contents afford tasty food and burnt jungle is a sure find for Bears in the early morning or evening. They also dig out the larvæ of the common black and yellow wasp from the ground. Once while shooting with F. in the Tezpur jungles, as we were returning to camp in the evening. We saw a Bear about 800 yards away which appeared to have two humps on its back. We put our elephants at full speed and hurried to the spot which was on a huge open, burnt plain. F. fired and rolled over the Bear, the same shot killing one of the cubs which the mother was carrying on her back thus accounting for the hump. The other cub was full of life and clasped the foreleg of F's elephant, which made the latter get very excited. It flung the cub backwards and forwards between its legs as if playing football with it, on being returned the cub was just a bag of bones. All three were carried back to camp and with the help of a lantern we examined the slaia. Out of the exit wound caused by the bullet streams of white grubs were pouring out; at first we

thought there must have been an old wound which was infested by maggots but next morning, on closer examination, we found that they were the larvæ of the common black and yellow wasp, several dead adults were coming out as well. We opened the stomach and found it full of comb, larvæ and adult wasps, the Bear had eaten everything. Now how could that Bear have avoided being stung on the lips and the tongue? I believe there must be some immunity or non-sensitiveness to bees' and wasps' stings. It is the same in some people the sting from a bee or wasp causing them no pain or swelling. My wife is a subject of this immunity.

The subject of Bears being so fond of the larvæ of the large scarab beetle is so interesting that I will go into it in detail. This beetle popularly known as the rhinoceros beetle, from the horns that project from the head, makes balls of Bison, Buffalo and Elephant droppings, preferably those of the latter. It digs a tunnel several feet into the ground and makes a large cavity at the end, the clay all round this cavity is compressed and made smooth by the beetle turning itself round and round. The balls of manure are then trundled by the hind legs, one after the other, into this cavity. The female generally does this, the male acting as an escort to see that she is not robbed on the way by another beetle. When sufficient fodder is provided for the grub she lays her egg in the mass. The larva, when fully in the grub stage, is about 2 inches long, greyish-white in colour with a reddish head, more like a caterpillar than a beetle. This is the morsel so prized by the Bear. Where there are regular manure heaps the beetle does not take all this trouble but lays her egg in the heap. After the jungle fires the ground gets baked and with it these nests. It is very puzzling when one comes on these round clay balls, split open by the Bear, lying near a digging. They look like a broken chatty (earthen vessel) and I did not know what they were until my tracker explained to me.

A detailed description of the Himalayan Black Bear is not necessary. In old animals the ruff round the neck is well

marked; it is also blessed with a special bone in a certain part of its body, not exactly where the lucky bone of a Tiger is found but in the lower regions; this bone is always kept as a trophy and I am told makes an excellent cigarette holder!!! As a demonstration of muscle I do not think anything, except the monitor lizard, can beat the muscles in the fore-arm of the Bear; and this, combined with the weight of the paw, enables it to inflict the most terrible wounds. As it always strikes at the head one comes across cases, generally of unfortunate grass cutters, where the whole face has been, practically, removed by one stroke of the paw. In the hills I have seen men with their mutilated features covered with a cloth to hide them. In one case, when I was at Tezpur, some natives were netting deer; unfortunately a Bear got into the net, bit the strands and attacked the trappers. Before it was despatched it had laid low two of their number. They were brought to my hospital, one man was practically scalped and the other very badly mauled about the face. I did all I could for them but both died from shock. The Bear always stands up before it strikes.

The claws of the Himalayan Black Bear are shorter than those of the Sloth Bear and the spoor is very like that of a human being.

Whether there are two varieties of the Himalayan Black Bear is a mooted point. This question was raised in the Journal some time back. I am inclined to believe that the large and small one are the same animal, the difference in size being accounted for by abundance or deficiency in food.

The Bear loves water and when it is hot, on being chased when wounded, it will take to a pool to cool itself, it hates heat and light.

In old Bears the teeth get yellow and broken or ground down. The sagittal or occipital ridges of the skull are very large and the lower jaw atrophies.

The she Bear produces one or two cubs at birth. A cave is generally selected for this purpose but once, when we were in "cholera camp" not far form Manipur, we discovered that one had produced in a very extraordinary place. This was a narrow, deep, very rocky nullah, across which a large tree had fallen, and the leaves and debris had filled up the space beneath the tree, we got some sepoys to stir up the stuff while N. and I stood ready at the outlet for the mother. She came out at a tremendous pace. It was N's shot first and I was not sorry he missed, our men then made a thorough examination of the nest and produced two cubs, each about a foot long, hairless and very like the enlarged young of a white rat. They were quite blind. We took them back to camp and the problem arose as to how to feed them. N. and I took charge of one each. We first of all tried feeding them with buffalo milk soaked up in cotton wool but this was not a success; then I proposed feeding bottles and two were produced from my hospital. These did quite well but my whole supply of rubber nipples was exhausted by the time the little beggars could feed themselves. They grew rapidly and I shall never forget all the trouble they gave us. Mine used to yell two or three times during the night for its bottle and I had to get up and feed it just like a child. They were jolly little beasts full of fun; they wrestled with each other and with us. Before we left camp for Cantonments they used to wander into the adjacent jungle for food but always returned every evening. They would eat anything but what they enjoyed most was lemonade. They would sit up on their hind legs, hold the bottle in their paws and gulp down the contents. As they grew bigger they became less docile, their wild instincts were aroused and returning. One day they visited a village about three miles away; the villagers got alarmed, so we set off to capture them. One of them injured a sepoy before it was captured. We could see that they were getting more savage so N. tethered his by a chain to a huge dumbell and gave it a bottle of lemonade to pacify it but the little brute hit his face with its paw and tore his upper lip. Our C. O. said they

must be got rid of; so, although we parted with our pets with much reluctance, they were despatched to the Alipur Zoo. Two years later I visited the Zoo and my little *Bhalu* at once recognized me. It came up to the bars of the cage and let me caress and scratch it, all the time making funny little noises. The poor little beast died a year later. I pitied the poor brute in the sweltering heat of Calcutta and am sure it must have often recalled the happy days it spent with us in our camp. So it is with all pets in India.

It is generally thought that the Himalayan Black Bear lies up in a cave during the day; this is fairly correct and perhaps applies to the Himalayas and certain parts of Assam, but, in the hills around Manipur, one comes across regular *machans* in trees where Bears lie up. These are roughly constructed by branches of the tree being pulled down and some bitten off to form a smooth platfrom. In one tree I saw three *machans;* one large one for the mother and two smaller ones for her cubs. Of course during the hot weather and the rains the *machans* are carefully concealed by the foliage and only come into evidence in the winter, after the leaves have fallen. Now why is it that Bears prefers *machans* to caves in certain places? The reason is that in certain parts the caves are at the sides of rocky water courses which during the rains become roaring torrents and flood the caves. The Bear knows this and considers the *machan* safer for its siesta. It is also cooler up there and flies, ticks, etc., are less troublesome. In accounts on Bears I have never read of the *machans* so the subject is rather interesting. When shooting in the Forest Reserves opposite Darjeeling I came across platforms of branches and reeds placed generally in a stream or on a damp spot by Bears but these were ground *machans*. Where Bears frequent, forest trees in fruit are often seen with their trunks scarred by Bears claws in climbing to obtain the fruit and broken twigs, fruit aid leaves may be seen on the ground beneath the tree. A favourite tree is visited night after night until the fruit is finished and this fact is often taken advantage

of in shooting Bears by native shikaris; it only entails a little patience to sit up for them.

In forests where Bears are found regular play-grounds exist, generally in isolated glades of short grass, the grass all pressed down in their gambols.

Bears, when suddenly come upon, will attack and make a most ghastly noise when doing so which is rather unnerving to the inexperienced sportsman. They also make a terrible noise when fighting and during sexual congress.

(To be continued.)

Big Game and Nature Photography.

By

W. MILBURNE.

(With two half-tone plates.)

The keen interest, particularly in India, taken in photographs of big game and other wild life, makes one wonder why nature photography has not, to a greater extent, taken the place of shooting.

Many older shikaris in particular, although they still enjoy the sport of the chase, view the results with regret. They no longer desire to shoot and for them, photography with its equally interesting trophies is an ideal sport wherein the jungle craft they have attained will stand them in good stead.

Many people who lack knowledge of photography, imagine that a great deal of time and experience is required before passable results are obtained. It has, however, made such strides during even the last ten years that a few hours study of any good modern text book on the subject and a weeks practice will, if the "time and temperature" method is



[*Author's Copyright.*]

A TIGER ON THE PROWL

used and given favourable conditions, produce good results from the start. Naturally, the more one studies the subject, the better will these be under adverse circumstances.

It is, in fact, not so much the photography as the subject that usually gives most trouble and a knowledge of the animal's habits is the main factor towards success.

A dark room, though preferable, is not necessary. Developing can be done at night using tanks, a cupboard can usually be made light tight for plate changing, even in camp, a few blankets covering the slides and plates is sufficient if this is done after dark. If as meticulous attention is paid to detail in developing the negative as is necessary in obtaining the exposure, the photographer need not fear failure.

Flashlight photography obtains the most successful results in this country. The nocturnal habits of big game combined with the denseness of the jungle in North East India, makes it almost indispensable because it is the only branch of photography in which the operator has full control of his most essential feature, light.

I personally, use the Nesbitt apparatus, but this is by no means essential. Very good results can be obtained by means of flares, and other methods will suggest themselves to enthusiasts. The main point is that the exposure must be short so that action is stopped, this makes all the difference between an 'alive' or 'wooden' looking result.

Flash light powder is certainly expensive, but the camera need not be so. The one used for the illustrations appearing with this article, cost only Rs. 65. In daylight work the position is altered. One has no control over the light therefore a far better lens is required. Sufficient light does not percolate through the heavy foliage of our jungles to give successful results and only occassionally will one have the good fortune to meet a denizen thereof in the open, returning home after dawn. These flashes of luck occur in every game and the man ready to take advantage of them, naturally scores.

But on the whole, daylight work is better suited to the smaller mammals and birds.

These fsw notes may, I hope, serve to point out that the technical side of photography is simple and should be feared by no one, but I should also like to put in a word for the preservation of our fauna.

The modern rifle has undoubtedly taken much of the spice out of shooting as a sport. It is so accurate and deadly at long range, that the personal element has been largely obliterated and the animals are rapidly sharing the same fate. On every hand we hear the tale of the extermination of game. Native poaching is blamed and is certainly one of the causes, but only one. Advance of civilisation in the form of roads, railways and cultivation are others which we cannot fight, but by using the camera instead of the rifle or gun, we can at least refrain from hastening the end while yet obtaining the same enjoyment from our sport.

For sport it is, requiring physical endurance and unlimited patience. In the case of daylight work, a quick eye and steady hand must be added to these and ability to follow bird or beast through heavy jungle, ready to seize one's opportunities, probably with poor light necessitating a fairly slow exposure, knowing that the slightest movement of the camera spells failure. In the case of flashlight photography, success lies chiefly in the preliminary work of tracking the animal and studying his ways. Though the actual moment of taking the photograph may not require one's presence, the thrill of feeling one has judged correctly as to his whereabouts at a given time and succeeded in placing the camera to within say exactly twelve feet of him, is well worth attaining.

In either case, should failure result, the disappointment may be great, but one has the consolation of knowing that no harm has been done nor a wounded animal left to die a lingering death.

Fishing in India and in Europe.

By

Colonel H. S. Wood, I.M.S.

(*Continued from page 78.*)

I have spoken of Butchwa or Butter fish (*Eutropiichthys vacha*), they are caught with worm and when rising take a small fly spoon well. It has barbels and should be handled carefully because the spine of the pectoral fin can inflict a very painful wound. The eyes are very large and sometimes, when caught, this fish emits a distinct squeak. They are delicious for the table, have hardly any bones and the flesh is of a light yellow colour hence the name.

Wallago attu.—The Bengali name is *Boali*. This is a mud fish, scaleless and very ugly. It has long barbels and a large mouth armed with teeth. It mostly feeds at the bottom of rivers and often sulks under overhanging banks amongst reeds and rubbish. It is an extremely voracious fish. I once caught one which was struggling on the surface of the water, having swallowed a fish almost as large as itself. It could neither dive nor swim but just flapped about on the surface. I have taken *Boali* on the spoon but they give no sport. They are dirty feeders and the flesh tastes muddy. (In Bihar we found young *Boali* quite good eating. *Editor.*) In camp my servants used to sit up at night catching them with a hook baited with the entrails of fowls; they caught quite a number some of them 15 lbs. in weight. (In Bihar they are often caught with a live frog on a hook, the frog squats on the surface of the water; one man uses a number of rods, thus baited, stuck in the ground on the edge of a tank or river. *Editor.*)

Garfish.—The Garfish (*Xenentodon cancila*) is a terrible nuisance as it constantly gets on to even big spoons when fishing for Masheer. They are nasty, slimy things with a

horrible, strong froggy odour. The only beautiful thing about them is that, when first taken out of the water, they have a lovely transparent, iridescent and opaline play of colours but this soon fades. They are full of fat and the natives liked them but we never ate them. In the Assam rivers I have seen them more than 18 inches long.

In addition to the above the Assam rivers hold a silvery Carp or shall I say a Roach. When the flying termites are on the move one sees these fish rising in hundreds to secure them, and fine sport can be got by baiting a hook with the termite. They rise just about an hour before sunset which is the time when the flying termites appear. This exhausts the river fishes. Of course there are many others like the Rock Carp, etc., but as they won't take any bait I leave them as non-sporting fish.

Tank fishing.—I never took to this although I had tank full of *Rohu* (*Labeo rohita*) in my jails and compounds in various districts. One simply sat, smoked and watched for the float to bob. Poles were stuck here and there in the tank to which were tied bags containing the bait used, generally *atta* or plantains mashed and flavoured with *gur* (native sugar) or aniseed or garlic. (In Bihar we have often seen a wriggling mass of worms tied on to one of these poles. *Editor.*) The fish went for these and made the bamboo wobble then the fisherman dropped his baited hook by the side of the bamboo and bagged his fish. I used to get my servants to hook the *Rohu* and then I played him; but I disliked this kind of fishing. Almost every Zamindar in Bengal has his tank for fishing *Rohu*. This sport, entailing little exertion appeals to most of them and the *Rohu* is good eating and *Rohu* curry is not to be despised.

I once saw a most wonderful sight while crossing the Brahmaputra at Tezpur in a dug out. About 50 yards below me I saw a large fish shoot about 12 or 14 feet into the air and something dark in the water beneath it. I hurried the boat

towards the spot and there saw what it was. A Gharial had hold of a big fish and was playing with it as a cat does with a mouse, shaking its head from side to side. The Gharial gave a jerk and sent the fish, which was a *Rohu* of about 15 lbs., into the air. It then caught it in its jaws as it nearly touched the water. This tamasha went on for about eight minutes and then the Gharial sank with its prey. I was quite close so saw it all clearly. The Gharial seemed to catch the *Rohu* transversely every time. It was a most interesting sight and I have never seen a similar one recorded anywhere.

Turtles.—The Assam rivers, in their lower reaches were full of turtles. They basked on the banks, sitting on stones and snags and slid or dropped into the water as our boat passed them. They are in great demand by the Bengalis as the flesh is considered to have aphrodisiac properties. They grow to a great size and sometimes it requires two men to carry one. When the rivers fall the Bengalis spear them with a very long spear. Terrible cruelty is inflicted in turtle catching and in their transit. One sees the poor brutes alive, lying wounded by spear thrusts in the bottom of the boats. For transit the flippers are perforted by bamboo slips and tied to the head; the head also being secured to the side. They are tumbled anyhow into baskets and put into hot, stifling Railway vans. I shall never forget the sight of the poor creatures being trunbled on to a Railway platform on a very hot day. In their agony, they were crushing the stones in their jaws when they got hold of any. When required for use the carapace is sliced off while the poor creature is still alive. The S. P. C. A. should take some action in this matter and frame rules for humane transportation, etc.

Destruction of fish.—During the last part of my time spent in India, between 1922 and 1927, I noticed how the fish in the rivers were being exterminated just as the game was. In the North Cachar Hills poisoning and trapping was done on a large scale at all seasons of the year and owing

to fine meshed nets being used everything from 1 inch upwards was caught. Another most destructive method was the damming up of the outlets of bheels at the end of the rains. Bamboo traps were placed at these outlets and huge hauls were made. As many fish spawn in the bheels one can realize the immense destruction done to their fry. The fish are dried and converted into *sukti mas*, with a most abominable smell. Even after the water has been let out of the bheels one will see the Bengalis wading in the liquid mud looking for stranded fish and mud fish. One can always tell where this is going on as hundreds of Brahminy and ordinary Kites are attracted to the spot. In addition to these methods dynamite is used, which is obtained from P. W. D. subordinates when blasting operations are being done. To give the Mahseer a chance all fishing in the higher reaches of the rivers, except by rod and line, should be stopped from March to the end of the rains. This was done for a few years by Government in the Sylhet district and the increase in fish was remarkable. The matter should be enquired into by the Agricultural, Fisheries and Forest Departments and new legislation passed. It is very difficult for Forest Officers to stop poisoning as this is done in out of the way places and when discovered the miscreants bolt into the jungle. If heavy fines were inflicted on the villages near where the poaching is done it would have great effect. The use of nets with very fine mesh and the damming of bheels should be stopped altogether. For miles and miles along the banks of the Sylhet rivers I have seen "bird-cage" traps put down destroying millions of fry of all kinds.

The places and villages where fish drying goes on become most unhealthy spots. The smell of the fish attracts myriads of flies and the sanitation is very crude. Epidemics of cholera are very prevalent. I remember once going into a hut in one of these villages where, inside a room, there was a corpse, dead from cholera, and a few feet away the family was partaking of a meal, the food being covered with flies!

A curious custom is observed by the Manipuris when they go into camp for fishing. A colossal figure of a woman, made of clay, complete in every detail, is made lying on the ground. Pujah is done to this figure and garlands and dried fish are presented, the latter being placed in a certain part of her anatomy.

Before concluding my remarks on Indian fishing I must allude to a peculiar climbing fish (*Anabas testudineus*) that I saw in the Sylhet bheels. It is well known that a Climbing Perch exists in brackish waters of the Sunderbans. (This is we believe, the same fish. It is got both in the Estuaries and fresh waters.—*Editor.*) that can climb trees by means of its fins alternately contracting and expanding them. (It is very doubtful whether they really can climb trees.—*Editor*). In Sylhet it is called *Koi mas*. It is yellowish-red in colour (Those we have seen have been more brown-green in colour. —*Editor*). I have found them in the water that collects amongst the branches of some old Jharal tree. Of course this is only possible in the rains when the trees are surrounded by bheel water. Those in search of this fish should beware of snakes that take refuge in these trees. The branches are those that issue from the main trunk. Here they get plenty of food and are not harassed by predatory fish. I noticed that in these trees there were always cracks in the trunk leading up to the collection of water and it is only this condition that enables the fish to ascend, much in the same way as a mountaineer ascends a couloir. The sharp spines of the fins curving downwards give a hold as the fish pushes its way up. The *Koi* fish makes the most delicious curry I have tasted and let me recommend another fish for the same purpose the Black Mud fish a most forbidding looking creature but, nevertheless, excellant for the table The Manipuri name for this fish is *Gnakra* and when it is caught it squeaks in the same way as the *Batchwa*.

I mentioned previously that in the river Veratri I saw Mahseer snapping up the withered and fallen leaves of the

Bauhinia as they were carried along by the current. The fish would not look at a spoon. I saw some grand fish in this river, some of them must have been forty pounders. This river is situated about 6 marches from Manipur and lies in a North-Easterly direction beyond Ukrul. We were not able to explore it much as, at the time, we were on a punitive expedition on the way to Somrah which lies in independant territory on the confines of the Upper Chindwin. The country all round was very beautiful, pine, oak and holly. The pines were very resinous with hardly any bark on the trunk, owing to the natural excessive exudations of the resin. From a commercial point of view I should think that the forests could be exploited with profit to produce turpentine. Towards the Manipur frontier there are a number of salt wells containing briny water. This is drawn up by a lever arrangement and the water is evaporated in pans to produce salt, horrid looking stuff looking like solidified ash. The evaporation is effected by means of fires, the wood of the resinous pine being used and therefore much valuable wood destroyed as, of course, there is no afforestation. In the neighbourhood of the brine wells, the whole country round is blackened with the smoke from the resin. The people, Nagas, who work the wells look like jet black devils as they never wash. Their houses and everything inside are the same.

The Nagas from the Independant territory beyond came into Manipur territory to purchase salt and it was this that led to our punitive expedition. Five women that came in died, on their return, probably from ptomaine poisoning. The tribe to which they belonged thought they had been poisoned by the Nagas in our territory. They raided, killed five people and took away the heads. The raiders were from the large village of Somrah and it was against them that our punitive expedition marched. Our force consisted of 200 Gurkhas, 4 British Officers, including myself, and the Political Agent of Manipur. We marched most of the way through beautiful country and had a great time.

Just before reaching Somrah we were met by the Chief and headmen of that place. They told us that they had cleared a good site for our camp on a plateau just below their village. Our C. O. was suspicious so we chose a site overlooking the village. We built a stockade, fixed up our two small six pounders and made ourselves comfortable. We were about 600 yards from the village as the crow flies.

Next day the Chief and headmen were summoned and the Political Agent laid down his terms which were, surrender of the murderers and a fine of Rs. 6,000 or its equivalent in cattle, grain, etc. They were given a week to comply with these orders. During the interval the men of Somrah became very truculent. They assumed full war-paint and made a demonstration by shouting, grimacing, jumping and indecent gestures; we could see that they were hurling abuse at us. A blank shot or two sent them all scuttling to cover. At the end of the week the Chief failed to comply so orders were issued to proceed to the village. The force was divided into four parties and I accompanied one under an Indian officer. When we entered the village we found it deserted except for some old hags and a few fowls; *Mithun*, pigs, goods and stores had all been removed. Several of the houses had human heads dangling from bamboos in process of dessication and in the interior of huts we found many more whch had a sort of bamboo network over them. In one house I found a Rhino horn which I took; it was apparently one from a Sumatran Rhino. We discovered that all the paddy, pigs and huge gourds had been buried in pits and most cleverly concealed. Our men had enough pork to last them for several days and we burnt all the paddy and sent the gourds rolling down the hillside. After this the Political Agent ordered the village to be burnt. All the old ladies were removed and then there was a conflagration. The bursting bamboos made a noise like musketry and gun fire.

The burning of the village had the desired effect as next day five men were surrendered, four of them were old and one

a lunatic. Our Political was suspicious and asked for the real murderers, which, in a few days time, were produced and duly marched to Manipur, where they were tried and swiftly dealt with.

I brought away some collar bands and amulets made of real human hair; the interwoven and coloured strips of bamboo were works of art; the colours used were red and yellow.

The Nagas of Somrah were of magnificent physique, tall, clean and well set up. They were Tankuls and recognized by the peculiar manner in which they dressed their hair. It was short at the sides, long on the top, like a crest and tresses flowing down the back, like the plume of a French Cuirassier. They cut their hair by passing a thin board under it and chopping it with a *dao* or knife, which gives it a ridge-like appearance. The unmarried girls wear their hair bobbed with a pony crop. Some of these were very pretty with olive skins and pink cheeks. The married women wear their hair long and knotted at the back. In this village stone implements were used to pound corn, etc. I saw some wonderful ornaments made of huge pigs' tushes and some of their jabbing spears must have been twenty feet long, most useful in thick jungle.

All the country round was lovely and very interesting and is certainly worth a visit. I suppose we were the first white men to tread those regions where head-hunting goes on unchecked.

(To be continued.)

The Occurrence of the Sheldrake.

(*Tadorna tadorna*) in the Duars.

Mr. E. G. L. Webb of the Binnaguri Tea Estate was fortunate enough to bag a couple of these rare duck on the Toorsa river in March 1932 and has kindly sent me an account of his getting them. Unfortunately he did not realize that

they were far more valuable as specimens than as table-birds so they went to the pot!! However he kept some of the feathers which convinced both O'Donel and myself that the birds really were Sheldrake. We now give Mr. Webb's interesting account.

"I spent from 2nd to 9th March in the Hasimara District fishing and shooting. On the morning of March 2nd I was on the Toorsa, opposite Jaigon, with my brother. He fished southwards from the starting point and I to the north. Shortly after we parted company I noticed a flight of between 20 and 30 ducks on the water, some 200 yards away. The birds would not allow me to get within gunshot, rising off the water as I approached and settling after a short flight, being careful to keep just out of range. They did this several times and then I lost them round a bend in the river. Having come to a good pool I commenced to fish but having no luck here I worked up the river, gun in hand, my man following with my tackle. Suddenly a flight of duck were on me, going down stream, and flying very fast. I just had time for a shot and bowled one over into the stream. It was not a clean shot, as the bird dived, and it was carried out of sight by the current which was very strong. My brother had not seen the birds very clearly and opined that they were Goosander, which rather damped my ardour. I know very little about duck but noticed what handsome birds they were, their black, white and chestnut markings showing up clearly and also possibly their red bills.

On March 8th I was fishing opposite Beech with W. Stowell when we saw a flight of duck coming down. He suggested, that we might get a Goosander or two for our men who would not object to the fishy flavour of this bird. I was lucky enough to drop two birds with my right barrel and touched up another with my left which, however, continued its flight.

Stowell on closer inspection proclaimed the birds to be true duck of a species never before seen by him. They had

duck bills of a very bright red hue and, as far as I can remember, the legs were much the same colour. I had shot a drake and a duck and, except for the knob on the bill of the former, they were exactly alike in appearance, or so I thought. While examining them I pulled out some feathers to make into flies and very fortunately among these was one chestnut one. The birds not being Goosanders graced our table instead of that of our men and were found to be jolly good eating. On returning to the bungalow Stowell looked up his book on water birds, which is not illustrated, and we both came to the conclusion that the birds were Common Shell Duck.

On April 12th I went down to the Dudua, our local stream, to fish. I left the Government road near the bridge and worked northwards with my rod. I did not have a gun with me on this occasion. Round a bend in the stream I flushed, only 30 or 40 yards away, four Shell Duck which had been feeding on the ooze near the bank. They flew north and settled on the water about 200 yards away. They were undoubtedly the same birds as I had seen on the Toorsa.

I mentioned the matter to O'Donel a day or so later and he was sceptical. Shortly after, when I was at his place, he produced his book on ducks and asked me if I could recognize my bird among the beautiful coloured illustrations it contained. I soon did so. O'Donel still remained unconvinced and I mentioned the feathers which, up to that time, had been forgotten. When he saw them he capitulated and wrote to you about the matter. On seeing the feathers I understand you also are convinced, hence this long and painful account."

In India this handsome duck is mostly confined to the North being not uncommon in Baluchistan. It has been found sporadically in various other parts even as far as Burma. We were fortunate enough to obtain half a dozen specimens in North Bihar, four in 1905, one in 1916 and one in 1923. In Bengal it appears to be rare. Finn got several in the

Calcutta Market and Stuart Baker writes that it occurs in Eastern Bengal.

Their natural habitat is the sea-shore and that is the reason why so few are found inland, our sea-coast too is not very suitable for these birds. They fly, swim, dive and walk well and their food is principally animal matter, vegetables coming sparingly into their menu. Mr. Webb considered them good eating. I forget whether I ate those I got, at any rate *they* were *all* skinned. Stuart Baker writes as follows about them as a culinary quantity.

"Of course they are not good to eat; which of the animal-feeding ducks are? And Hume says "even skinning has no effect. It is certainly not to be expected it would have much, as flavour, unlike beauty, is more than skin-deep, though skinning has with many birds a certain amount of good effect." Finn writes:—"as food it is one of the very worst of ducks, and indeed is not usually regarded as eatable." How tastes differ, "what is one man's meat is another man's poison"!!

Editor.

THE JOURNAL OF THE DARJEELING NATURAL HISTORY SOCIETY

EDITED BY

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

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The Purple Thrush

Male, female, and nestling. 2/5 Nat. size.

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OF THE

DARJEELING NATURAL HISTORY SOCIETY.

Vol. VIII. No. 4.

Game birds of Sikkim, including the Darjeeling District, and of the Jalpaiguri District, Bengal.

BY

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

(Continued from page 97).

Our next genus is *Arborophila* which contains the Hill-Partridges. They differ both in habits and anatomically from the true Partridges; their legs are comparatively longer and their claws long and straight. The tail is composed of 14 soft feathers. Nine species and subspecies are found in the Indian Empire but only three of these occur in our area. As their name implies they are all hill birds.

38. The Common Hill-Partridge.

Arborophila torqueola torqueola (Valenc).

In the cock the crown is bright and the ear coverts paler chestnut; the lores, cheek, and a broad streak over the eyes are black, the latter mixed with white near the crown and at the nape. The chin, throat and sides of the neck are black, the latter edged with white; there is a white moustachial streak and a white band below the white

throat. The upper plumage is golden olive-brown barred with black and the upper tail coverts with large triangular black spots instead of bars; the wings are widely margined with chestnut and blotched with black on the coverts. The breast is slatey-grey shading into white on the abdomen; the flanks are grey, edged with chestnut and with central elongated white spots; the under tail-coverts are black with white tips.

The bill is black, the iris red-brown; the bare skin round the eyes crimson and the legs fleshy-grey.

The cock measures from 10 to 12 inches with a wing about 6 inches. A fat cock, weighed by Hume, scaled 13·6 ozs.

The young cock is "like the adult but with the supercilia obsolete or entirely wanting; there is no chestnut on the flanks and but little on the scapulars and coverts; the whole of the lower surface is covered with white drops from breast to vent." *(Stuart Baker).*

The hen differs from the cock in having the crown and nape brown streaked with black; the sides of the head, neck and throat are rufous spotted with black, there is a rufous band below the spotted throat; the breast is brownish and the white spots on the flanks are larger and generally extend to the lower breast. The upper plumage is more broadly barred with black.

The bill is black or sometimes with brown on the upper mandible; the iris is brown; the skin round the eyes is dull purplish-pink and the legs are as in the cock.

The hen is rather smaller than the cock. The weight of a small hen, according to Hume, was 8 ozs.

The young hen has "a white spot as the extremity of the feathers of the chest as well as the underparts, and the

outer webs and tips of the primaries and secondaries are mottled with rufous buff. (*Cat. Brit. Mus. Vol. XXII*).

There is a very poor illustration of the chick in *Hume and Marshall's Game Birds* but I can find no description. I describe a specimen in my private collection.

The upper plumage is deep rufous-brown with a patch of rufous-fawn from above the eye to the nape broadening out behind; the sides of the head, the chin and throat are rufous-fawn, with a deep rufous brown streak from the nostril and over the eye, and another of the same colour below the eye and above the ear-coverts; the ear-coverts and a moustachial streak deep rufous-brown. The wings are light rufous stippled with brown. The lower plumage is rufous-fawn with a band of deep rufous-brown below the throat.

The bill is dull red; the iris brown and the legs brownish-orange.

The distribution, according to Stuart Baker, is:—"Garhwal and Kumaon to the extreme East of Assam, North of the Brahmapootra and to Tibet, etc. South of this river it is found rarely in the higher ranges of the Naga Hills and the Barail Range and other high ranges North of Cachar and Manipur. Rothschild attributes to this race three specimens obtained by Forrest in Yunnan." Stevens writes about our area;—Recorded "commonest between 5,000′ and 8,000′ or 9,000′, occasionally found at 14,000′." This partridge is, in my experience, much *more plentiful on the Outer Ranges* than it is in the interior, yet occurring at similar altitudes. It may possibly reach this recorded lower limit of 5,000′ in the interior, which is however erroneous for the outer ranges, as there is no overlapping in the zonal distribution of this species and *A rufogularis* where they meet. Neither do they move to any extent during the winter. A fine series secured in the Mai 'Khola'

in East Nepal at elevations of from *7,000′ – 10,000′ during March and April*, and obtained in the Lachung Valley at 8,000′. "

We have seen it at Tonglu and Phalut at about 10,000 ft. in April and July. It is a bird of higher elevations than the next species. Stuart Baker writes :—"In the Darjeeling District it may wander down below 5,000 feet, but is most common between 7,000 and 9,000 feet." It is very doubtful if it ever descends as low.

These Hill-Partridges are forest loving birds especially where the hill-sides are broken up into ravines with streams running down them. We found them amongst rhododendrons which were fairly free of under cover. Those we saw were in small coveys of about half a dozen birds ; once, in early July, we came across the parents with three chicks. They were very tame and allowed one to observe them as long as one remained quiet. They ran about quickly every now and then stopping to pick up a seed or other small morsel. They are very round little birds, their back highly arched, in fact, when at rest with their heads tucked in, the whole of the back down to the tip of the tail is one curve with tip of the tail pointing slightly inwards and downwards. They perch freely on trees but those we saw were on the ground.

I, once, watched a cock calling ; it did so from the ground but they do not invariably do so as they have been many times noticed doing so from a stump or other elevated position.

The bird threw its head back and uttered a monotonous whistle of a single note ; it then walked on for a couple of paces and whistled again ; sometimes it whistled twice without moving and sometimes picked something off the ground between calls. The notes were all uttered while under a bush ; when it came into open spaces it ceased calling. It

has another call, which was not heard as often as the single note, this sounds like *wha-whoi, wha-whoi,* there is sometimes a third *wha-whoi.* It is uttered in the same manner as the single note.

Bailey has heard a captive bird answered by a wild one in the forest. He heard his bird whistle in March and April and we heard it continually during May. We have also seen a shikari call up these birds with ease.

Stuart Baker writing about this Partridge says :—"They were nearly always in small covies of from 5 to 10 birds, almost certainly just a pair of old birds with their last family.

"They are quick yet deliberate in their movements, and scratch about here and there, turning over the leaves, picking up a seed or two and then dashing away a few paces to a more tempting patch. Perhaps some of the party will then sit down for a seista, and for this they love a tiny patch of sunshine, where they can bask with wing outstretched, first on one side and then on the other ; but unless it is getting late in the morning, within a few minutes they are once more on the move, and busy with the important occupation of feeding."

"They look like little balls of feathers as they sedately walk about, very neat, yet very soft, their little tails, tucked in tightly, held pointing almost straight to the ground, their wings held not too close to their bodies and often quivering as they ran, but never extended".

With regard of their call the same author writes :— "They are very conversational birds and keep up a constant succession of soft low whistling notes intermixed with notes which may be best described as like very soft coos of a dove. Their call note during the breeding season is quite different, a loud, though melodious double whistle which carries a very great way even in dense forest. This note is only used

during the breeding season, and then only in the mornings and evenings, and generally, I think, from some elevated position, preferably a branch about 20 feet up in a biggish tree".

The note is also uttered from the ground as we have already described.

These birds are, like all Hill-Partridges, great runners and prefer to use their legs to their wings but they can, when driven to it, fly at a good place.

Their food consists of seeds, insects, roots, etc. I have seen captive birds eat grain readily.

Hume mentions that "in some parts of the hills, the shepherds do not like your killing these birds; their call is precisely like the whistle by which the shepherds call their flocks, and these worthies will, in place, gravely maintain that the birds are animated by the souls of their (the shepherds) deceased *confrères*".

These Partridges breed throughout their range from April to June. The nest is just a depression in the ground scratched by the bird and, according to Stuart Baker, it will, sometimes, make a real nest "of grass, leaves and weeds, matting them well together, and raising the sides so that the whole affair becomes a very deep cup".

They lay from 4 to 8 eggs, pointed ovals in shape and glossy white in colour. They measure about $1{\cdot}8 \times 1{\cdot}2$ inches.

The flesh of these Hill-Partridges, though dry, is quite good but Hume considered them "very good eating when you can get nothing better"!

They do quite well in captivity, even in the climate of Calcutta, specimens in the Alipur Zoo lived upwards of six years. Bailey found they did better at Gangtok, than the next species. We have seen the cock feeding the hen and those in Bailey's aviary were very fond of maize.

(39) Blyth's or The Rufous-throated Hill-Partridge.

Arborophila rufogularis rufogularis (Blyth.)

The crown is olive-brown spotted with black; a broad eye-brow and sides of face greyish-white speckled with black; the upper plumage is olive-brown, the feathers of the rump and upper tail-coverts with central black triangular marks; the wing-coverts are chestnut marked with olive-grey and broad black tips; the sides of the neck, and chin to foreneck are rufous, the chin and throat spotted with black; the breast and flanks are deep grey paler on the abdomen; the grey breast is divided from the rufous foreneck by a black band and the flanks are marked with deep chestnut, each feather with a white spot in the centre.

The sexes are nearly alike. The bill is black; the iris brown; the bare skin round the eyes lake-red to bright red and the legs pale pinky-red to salmon-red, "coral red" (*Shaw.*)

Hume's measurements for cocks are:—Length 10 to 11 inches and wing 5·12 to 5·37 inches. Weight 7 to 10·5 ozs.

His measurements for hens are:—Length 9 to 10·5 inches and wing 4·9 to 5·2 inches. Weight 7 to 10 ozs.

Young cock:—"Throat immaculate rufous-brown, much paler than in the adult; underparts smoky-slate with numerous white spots all over breast, abdomen and flanks." (*Stuart Baker.*)

Chick:—A chick presented to us by Mr. Shaw and obtained by him on the 26th May is as follows:—Whole upper plumage chestnut, with rufous-fawn forehead, an eye-brow the same colour but lighter and a dark streak from nostrils, over the eye to back of ear-coverts where it is broader; chin, throat and abdomen fawn, remainder of lower plumage rich rufous-fawn; quill feathers brown.

The distribution according to Stuart Baker is "Kumaon and Garhwal to the extreme East of Assam."

With regard to the distribution in our area Stevens writes :—"Recorded from the base of the hills up to 6,000′ which is substantially correct for these hills. I have no definite information of its lowest limits, but it is fairly plentiful in forest around Gopaldhara at from 5,000′—6,000′ where I have obtained many during December to February.

It appears to have a somewhat higher zonal distribution in the Tista Valley where it apparently does not come into competition with *A torqueola*, as Mr. G. E. Shaw reports it at elevations of from 3,000′—8,400′ below and above Mangpu." Our specimens were all collected in these hills between 3,000 and 6,300 feet. We found it common above Buxa, in the Duars, at 3,000 feet.

They are essentially forest birds living in those that are evergreen but also may be found in scrub, bamboos, etc. They also come into tea cultivation where nests were found by the late Mr. A. M. Primrose.

Their call is a loud far-reaching whistle, described well by Stuart Baker as "a sound like *Wheea-whu* repeated constantly and slightly ascending in scale with each repetition." They are more vociferous during the breeding season. Stevens writes :—"This partridge is often to be heard calling before and after rain when I have known this to happen after a thunder-storm as late as the 20th of July. Towards the breeding season they commence to call in the foot-hills around 2,000′ as early as the 21st of January. The chick soon after hatching actually gives utterance to the identical call of the adult." This call is easily imitated and the birds can be called up. They fly well but give difficult shots owing to the nature of the country they inhabit and often fly into trees. They go about in small coveys of about 6 to 12 either two parents and chicks or two parties of these.

Beavan wrote to Hume that "This species is more abundant than *A. torqueolus* in Sikkim, and near Darjeeling inhabits a lower zone than the preceding, of from 4,000 to 8,000 feet. It is found generally in coveys and numbers are captured by the Lepchas by calling them within shot and taken into the station of Darjeeling for sale. These birds inhabit such dense cover that shooting them in any other way is almost out of the question." The Lepchas may perhaps capture numbers of them but certainly now-a-days numbers are not brought in for sale.

Godwin-Austen gives an account of how these birds are snared in the Daphla Hills. He wrote : —"The Daphlas, like the other hill tribes, are clever at this art, and the mode of capturing Pheasants and Partridges is simple and worth describing. As it is the habit of these birds to get down low at night into the warmer ravines, and feed upwards along the crests of the spurs, they stop the progress of the covey by a zig-zag barrier about two to three feet high, made up of twigs and short pieces of bamboo stuck into the ground, which is rapidly formed and extended a short distance down hill on either side. A narrow opening is left here and there, generally at the re-entering angles, and in this the noose is set, just above the cross sticks and in the same plane, at exactly the height of the bird's breast. The noose string is made of a thin slip peeled off the outside of a bamboo, and tied to the end of a pliant stick, drawn down like a spring, and hitched into a saw nick in a bamboo peg, into which the flat form of the string forming the noose fits close and accurately. All the materials grow on the spot, and in a few hours hundreds of barriers and snares can be made and set. The birds are often caught alive by the legs."

With regard to its nidification, it is said to breed up to 8,000 feet where Masson said he found a nest which he describes as having been well-made of grass partly domed and densely lined with grass ; but other observers describe the

nest as a mere depression in the ground well lined with grass, which is more likely. The nest is situated in various kinds of jungle, generally in forest but alse in scrub jungle, tea, bamboos and grassland. Stevens found them breeding "in evergreen forest in rocky broken ground, with an under growth of moss, ferns and bracken." This is their usual habitat.

They breed from April to June or early July, earlier in the lower and later in the higher parts of their habitat. They usually lay from 3 to 5 eggs but 8 have been recorded; Stevens mentions 7. In colour they are china-white and very smooth. According to Stuart Baker they average 39·9 × 30·2 mm.

There seems little on record about these birds in captivity. Bailey didn't find them do as well at Gangtok as the Common Hill-Partridge. Sanyal doesn't mention them as having been tried in the Alipur Zoo. Flower, quoting C. Barnly Smith, gives 8 years as the duration of their life. (*Contributions to our Knowledge of the Duration of Life in Vertebrate Annimals—Proceedings of the Zoological Society of London, 1925, page 1408.*

(To be continued).

The Purple Thrush.

Cochoa purpurea Hodgson.

(With a coloured plate.)

By

C. M. Inglis, F.Z.S., F.R.E.S., B.E.M.B.O.U.

Our personal knowledge of this fine Thrush is very limited indeed and this short article consists of quotations from the writings of those naturalists who have been more fortunate than we have. The cock and hen have been

recently figured in *Les Oiseaux de L'Indochine Française Vol. III plate XXXII*, but we don't think the nestling has been figured before.

It is not necessary to give a description of this bird as the coloured plate depicts both sexes and the nestling, the male on the left with the female behind it and the nestling on the right. They were painted from fresh specimens collected at Rungirun and are shown in a thicket of wild yellow raspberry.

The Purple Thrush is, with us, a very rare and extremely local bird. Stevens apparently never came across it although he collected very thoroughly and, until the end of July 1932, the only specimen we posessed was that of a male kindly presented by Mr. Shaw, who collected it at Mangpu at an elevation of 5,000 ft. on the 13th May 1920. Neither Mr. Shaws' nor our collectors nor ourselves could locate this bird again. On the 29th July and 3rd and 4th August 1932, we were at last sucessful and collected two adult males, one adult female and one nestling at Rangirun in the Darjeeling District at an elevation of 6,300 feet. Mr. H. V. O'Donel has also obtained a female at Ramam (8,000 ft.) in thick ringal bamboos on the 19th May 1933.

With regard to its status in our area Stevens remarks in his "*Notes on the Birds of the Sikkim Himalayas*" :—

"Recorded without doubt as a permanent resident up to 8,000′ at least. I have no hesitation in stating this information to be misleading as apart from its rarity, there is little likelihood of meeting it in "the cold weather" when collecting is not so restricted as it is in "the rains," and though odd birds might remain in the bottoms of the deep valleys, only systematic searching during April to May onwards will reveal its status, when it is certain to visit its breeding grounds in common with numerous other species of Ground-Thrushes. Once obtained above Mangpu at an elevation of 5,000′, male 13.5.20. (G. E. Shaw.) Blanford obtained one

specimen on the Cho La Range Kaphu ? (Kapup) at 10,000', 28.8.70. Represented in the Tring Museum, male, female June, *ex* Elwes collection. In the British Museum series there are seven adults, April to August, three juveniles, Augnst aud September and a single immature male January 1876."

The distribution, as given by Stuart Baker, is :—"Himalayas from Simla to Eastern Assam, North and South of the Brahmaputra ; Manipur, Chin and Kachin Hills, Hills of Central and South Burma to Tenasserim."

The birds we were fortunate enough to secure were all from the same patch of forest. The Purple Thrush is essentially a forest bird and, with us, usually keeps to those which are humid and evergreen but Mr. O. Donel secured one in heavy ringal bamboos. In Shillong, however, Stuart Baker found it "in the pine-forests where there was undergrowth and a mixture of other trees in the ravines." The little we were able to observe of this bird concides with what this naturalist writes :—

"It is a shy bird and in spite of its brilliant colouring by no means conspicuous until it strikes a patch of sunlight, when it is transformed at once into a most beautiful object. It is a very quiet bird and beyond a low chuckle I have heard no note. It feeds largely on fruit and berries and to a less extent on insects".

Jerdon wrote about it :—"I found it very rare near Darjeeling, and only obtained one specimen, which was shot at a considerable elevation above 8,000 feet. Hodgson says "They are common to all three regions of Nepal. They are shy in their manners, adhere exclusively to the woods, live solitarily or in pairs, breed and moult but once a year, nidificate on trees, and feed almost equally on the ground and on trees. I have taken from their stomachs several sorts of stoney berries, small univalve mollusca, and sundry kinds of aquatic insects".

With regard to their nidification Stuart Baker writes as follows:—"This beautiful Thrush breeds in May, June and July at heights between 3,500 and 6,000 feet and possibly up to 8,000 feet.. It makes a rather loosely put together shallow cup-shaped nest of living green moss lined with black fern and moss roots and rachides. It is very untidy outwardly, scraps of moss sticking out in every direction but the inner cup of roots is more firm and compact. It is usually placed on a small tree, 6 to 20 feet from the ground, standing in evergreen forest but it sometimes breeds in pine forest. The eggs number two or three, very rarely four, and are typically Thrush-like in character but very handsome and richly coloured. They range from eggs like the English Blackbird, though brighter and redder, to eggs with a bright pale sea-green ground richly: blotched with reddish. The texture is fine and close but not glossy as in *citrina* eggs, and many are practically indistinguishable from the eggs of *Zoothera*, though generally longer ovals in shape. Fifty eggs average 31·3 × 21·6 mm".

BEARS AND THEIR SHIKAR.

By

Colonel H. S. Wood, I.M.S.

(*Continued from page 110*)

The fat of the Bear is in great demand for all sorts of rheumatic pains and swellings and our camp, after shooting one, used to reek of the smell of its being melted down in kerosene tins. Everything seemed to smell and taste of Bears' fat. The bile is supposed, by the Kukis, to be a panacea for every ailment under the sun even including small-pox.

The droppings of the Bear are very like those of a human being and fruit stones will be found in the mass.

Tigers will sometimes devour the carcass of a Bear, I will refer to one instance which occurred in my wanderings when dealing with Tiger. The Bear has a distinctive odour of its own and as regards the meat all I can say is that it is rank and coarse. I tried it once and never again. I notice that it sometimes figures in the menus of certain fashionable restaurants in our country and abroad. I daresay in the hand of a clever and capable *chef* it may be made palatable. It is generally best to keep away while a Bear is being skinned as they swarm with ticks.

The various ways of shikaring Bears are :

1. Tracking them up.
2. By beating them out of heavy jungle.
3. By sitting up for them over crops of *makai* or some favourite fruit tree.
4. Going over burnt jungle, in the very early morning or in the evening, on an elephant when Bruin is on the move.

However, I think most sportsmen have come on them unexpectedly whilst after other game ; all my Bears were shot in this manner.

The first method is hopeless owing to the nature of the ground and after miles of tracking probably one will find the beast has taken refuge in a cave. From this the animal may certainly be drawn out by means of smoke. N. of my regiment, was very successful with this method in the Khasia Hills, but one day he had a nasty accident and nearly blew his foot off by firing too soon and vertically at the Bear as it came out of the cave. He was sitting on a rock above the cave with his legs dangling down when the accident occurred.

The second method is I believe adopted by the tea planters in the Darjeeling district and I think in the cold weather shoots some have been bagged in this way.

The third method is very unsatisfactory, uncertain, unhealthy and disappointing.

The fourth method is the best and in the Nowgong district of Assam, burnt jungle visited at the proper time is a certain find for the prowling *Bhalu*.

A fifth method, which I have never seen mentioned in any shikar book, is to bomb them out of caves. This seems to be rather a mean and unsporting method but what else can one do when they will lie up in these deep recesses. B, a shikari well known in Assam, was the first to tell me of this method and he had considerable success. Once while he and his wife were ready at the mouth of a cave, whilst bombing operations were in progress, no less than three Bears came out, he only bagged one. Whilst on tour with my Magistrate we made up our minds to try this method. I knew of a place near the hot springs called Kopili that had some caves and which, in former years, held so many Bears that no native could be induced to go near the spot. This place was called the Koorung, an isolated range of thickly clad sandstone hills. Along one side ran a murky, dank, sluggish stream choked here and there with the debris of ages. From the banks the sandstone cliffs went sheer up 20 or 30 feet and it was in these that the caves were situated. Beyond the range there were miles upon miles of grassy plain, on my first visit to this place the grass jungle was full of tracks leading to and from the hills. It was a most eerie spot. On that first visit a dreadful tragedy took place resulting in the death of one of the best shikari servants I've ever had in India, which I will relate in detail when writing on Bison.

I procured about twenty native bombs, such as one sees hanging up in bazaars. They look like turnips and are constructed of rope and hemp drawn tight over the powder; a hollow bamboo full of powder runs into the

interior and a bit projecting outside acts as a fuse. We lashed several lengths of bamboo together and placed a tuft of grass on the end of this, the bomb being placed on the grass. When all was ready the grass was lit and the whole bamboo thrust rapidly into the cave. The report was terrific and shook the ground on which we stood. We drew blank. Had there been any Bears they must have come out. Alas ! since my first visit, all game, including the Bears, had left this paradise owing to the authorities allowing villagers to settle close by. However the experiment was interesting and we got a good deal of fun out of it.

In my shikar after Bears two occasions were red letter days and these I describe.

When I was stationed in Manipur the Medical Officer of a regiment that had been sent up from Bombay to construct the Manipur—Kohima road, died suddenly and I was told off on temporary duty with them, I was very pleased at the idea as the camp was situated in grand shikar country. The Regimental Officers were very keen on shikar but absolute greenhorns. The C. O. opened the ball by shooting a tame *Mithun* close to the camp. He was terribly pleased, taking it to be a real wild Bison and the skin was pegged out in front of his tent so as to be admired by everyone. I *knew* it was a tame *Mithun* but said nothing for fear of hurting his feelings. Next day, the owner, who happened to be one of my Kuki trappers came to the camp and demanded compensation. The C. O. was adamant so the owner went to the Political Officer in Manipur who made the C. O. pay the owner Rs. 80. How we all laughed !! Shortly afterwards one of the officers shot a tame buffalo just below our camp, of course, under the impression that that it was a wild one. Another officer took leave and went to Golaghat and managed to get his hired elephant badly gored by a wild buffalo and had to disgorge many

rupees. All round their experience of big game shooting was not much of a success.

After this digression I will proceed. T. suggested that he and I should take ten days leave and do some shikar on the Kowbruh slopes. He said he would make the *bandobust* which meant No tents!! No camp beds!! We constructed "lean to's" to sleep in and, worst of all, before our ten days were over all the servants, including the cook, went down with malaria and our stores ran out. I remember our last meal consisted of some venison and tree fungi. It rained hard during the night prior to our return, every thing was soaked and T. and I both got fever.

Well we went along together, each with a tracker, T. leading down the hillside. Suddenly I saw T's tracker point vigorously to our left. T. being short-sighted and wearing glasses apparently could not spot the animal so I went down beside him and saw an enormous bear facing us, not 20 yards away. T. spotted the Bear at the same moment and our rifles rang out. I was using a 12 bore rifle and T. had a ·500 Express. At the shots the Bear went off and we followed in hot haste. It was bleeding profusely so tracking was easy but what ground that beast led us over—belts of nettles three feet high, rocky and steep nullahs crammed with all kinds of creepers and thorns, etc. The Bear crossed a stream, with a big pool, and the water was quite red. Bruin had apparently stopped for a bath before proceeding. After about an hour I spotted him going slowly up a slope; I fired and he spoke and disappeared over a ridge. We topped the ridge, and about half way down I heard a rustle of branches and leaves above me and the next instant my *sola topee* and rifle were knocked from me. I realized that another Bear had almost dropped on to the top of me. It then stood about six yards away from me trying to make up its mind whether to charge me or not. I was powerless so shouted to T. who was not far

behind me and he hurried up and fired but missed the brute. I was not hurt except for a sprained ankle. It was lucky that the mass of 400 lbs. did not catch me full otherwise my neck would have been dislocated and the base of my skull fractured.

I could not go on tracking the wounded Bear so told T. to carry on and that I would return slowly to camp which was about 7 miles away. Before T. left he said "Would you mind lending my tracker your shot gun and some cartridges?" I did so. On the way to camp I, unfortunately, ran into a bee's nest, which hung from a branch, and got badly stung on the face. My tracker darted off and brought the root of the wild ginger, sliced it, and applied it to the stings, it certainly relieved the pain, probably the alkaline juice of the plant neutralizing the formic acid of the poison.

Before leaving the spot where the Bear dropped on me I examined the tree and saw, high up, one of the *machans* of which I have spoken. To this day I cannot make out whether that Bear intended to attack me or whether it got frightened and tumbled down. From the fact that it stood after the fall I think mischief was meant and I was very fortunate to have escaped so lightly.

T. had arrived in camp before me and told me what happened after we parted. After about two hours tracking the wounded Bear was found lying up in some sungrass. There was a rock not far off which overlooked the spot so T. stood on this and sent the tracker in to the grass to stir Bruin up with my shot gun. The Kuki fired about three shots, there was a rush and out darted the tracker, dropping my shot gun. The Bear get hold of it and reduced the thin part of the stock to matchwood and the locks and trigger guard were beyond repair. I was terribly disgusted, as in an isolated place like Manipur, it would take weeks to replace

my gun and, at that time, I was not overburdened with wealth. Shortly after mauling my gun the Bear rushed out and T. gave it the *coup de grace*. Next day 17 men were sent to bring it in. It was a huge brute taping 6 ft. 7 inches from nose to tail and very fat and heavy, and with a splendid coat.

It was marvellous the distance the brute travelled after the first two shots. The two bullets had entered its chest close together; T's had flattened in the shoulder but mine had come out at the lower part of the chest cavity producing a huge wound and after this it took two more shots to kill him. My opinion is that the Bear is a tough beast and will carry a lot of lead unless the first shot clean bowls him over.

The fat lay 6 to 8 inches on the loins and back and masses of it round the kidneys and in the omentum of the intestine, so my men were very happy and Bear's fat was boiled down for days.

After all the exposure and privation I went down with an attack of cerebral malaria with a temperature of 105°. My unfeeling temporary C. O. would not let me return to Cantonments so, against all regulations, I went direct to my boss in Shillong and was removed in a *dhooli* to Manipur. My *pucca* C. O. kindly met me on the way and gave me half a pint of champagne which put new life into me and with careful nursing I was soon myself again. The Adjutant of my regiment lent me his shot gun until a new one arrived so I forgot all my troubles and loss.

My second exciting encounter with a Bear happened at Kopili when I was after Bison. One evening my tracker and myself went out to look for a solitary Bison whose tracks we had seen on the previous day. We were on the top of a hill and I was scanning the jungle, which had been fired, with my glasses for the beast. About a mile away we spotted a large black animal moving about and, with my glasses,

I made it out to be a huge Bear eating the roasted grubs it found in the round nests of the black tree ant. About three quarters of an hour remained before the sun set so both of us rushed down the hill towards the object. Where the beast was feeding was undulating ground and my shikari funked it and remained behind in a tree. I went on alone and had topped several ridges when I suddenly came on the Bear digging and almost half way down a pyramidal hole. I could only see his vast posterior and part of his back. I let drive with a soft nose from my ·450 H. V. which raked him from stern to stern and, with only a tremor, he fell dead in the hole. I was delighted and returned to camp in the darkness. Next morning my wife with 15 men accompanied me and we brought the Bear into camp. He was the biggect I have ever seen taping 6 ft. 8 inches from nose to tail and his coat was perfect A rather amusing thing happened to the skull which I had cleaned and hung up in the cook shed. When we were leaving camp in was missing and the cook told me that a half witted coolie of ours had made soup out of it. On the day we brought the Bear in a fearful tragedy befell our servants which transformed our camp into one of sorrow and sadness.

The "Paharis" of Mussoorie believe that the Bear thrusts grass and leaves into its wounds to stop the flow of blood! This is not credible. Probably owing to the fearful jungle it goes through, parts get thrust into the wounds and so have given rise to this belief.

[Pocock *(Journ. Bomb. Nat. History Soc. Vol. XXXVI. No. 1 pp. 108–131)* gives 6 subspecies of this Black Bear and one provisional one. Of these either one or two are found in our area. Those mentioned by Pocock are ; *Selenarctos thibetanus thibetanns,* G. Cuv.

Distribution. "Assam west-wards apparently to the Nepal Terai and eastwards through Burma to Siam, Annam and possibly Southern China."

Selenarctos thibetanus laniger, Pocock.

Distribution :—"Kashmir and probably at relatively high elevations elsewhere in the Himalayas." Under this subspecies he gives as a synonym ? *Ursus torquatus* var. *arboreus*, Gray. with the type locality "Darjiling."

Selenarctos thibetanus gedrosianus, Blanford.

Distribution :—"Baluchistan." This race he only admits provisionally.

Selenarctos thibetanus mupinensis, Heude.

Distribution :—"Western China : Moupin, Shenai, Szechuen."

Selenarctos thibetanus ursuricus Heude.

Distribution :—"North China, Manchuria, Amurland and possibly Kamschatka."

Selenarctos thibetanus japonicus Schlegel.

Distribution :—"Mountainous parts of the Japanese Archipelago (Temminck)."

Selenarctos thibetanus formosanus Swinhoe.

Distribution :—"Formosa and possibly S. China."

The only two that interest us are *Selenarctos t. thibetanus* and *Selenarctos t. laniger*.

With regard to the former, which is the typical race, he says it "may be distinguished from the more northern races by its comparatively short, coarse, coat without underwool." With regard to Sikkim skins he writes :—From Sikkim I have seen two skins. One collected by Mandelli and presented to the Museum by Blanford. The coat is thicker than in the skins from Nepal and Assam I have examined but has no appreciable underwool ; it is of medium length, about 1½ to 2 ins. on the body and from 4½ to 5 ins. on the sides of the neck. The muzzle is brown, not dark, above, tan at the sides, the chin is white and the collar, about 13 or 14 ins. from point to point, very narrow and passing a long way back over the sternum, is buffy white.

The second, a cub 2 ft. 9 ins. long, from Lachung, 9,000 ft. (C. H. Dracott), kindly lent to me by the Bombay Natural History Society, has the coat long, thick and soft, with a good deal of brown underwool, the hair on the sides of the neck being 3·2 ins., on the back 2·1 ins, on the flanks 3 ins. The muzzle is brown, but not dark, the whole of the chin is buff black to the corners of the mouth, the buff extending to a point along the fore part of the throat; the collar is the same tint, broad and Y-shaped, the posterior branch shorter than the arms; the paws are brown along the margins and round the digital pads. In the quality and length of its fur and in its well developed underwool, the skin closely approaches the races from Kashmir and Szechuen and perhaps belongs to the latter. It certainly differs from typical short-coated Assamese examples of *S. thibetanus*.

Selenarctos t. laniger is according to Pocock "Distinguishable from the typical form, represented by the Assamese skins, by its longer, softer and altogether more luxuriant coat which carries a very appreciable quantity of underwool, especially on the neck in winter." Further on he remarks. "This race of *S. thibetanus* is probably rather 'environmental' than 'local'. It is linked with the typical race found at lower levels in Assam by the Sikkim specimens recorded above; and it is probable that wherever *S. thibetanus* occurs at tolerably high altitudes in the Himalayas and elsewhere it aquires a longer coat with underwool, especially in winter."

Rowland Ward gives the record for the Himalayan Black Bear as, length of *skin* 8 ft. 5 in. the record measured from nose to tip of tail as 6 ft. 9 in. The weight of one from Nepal is given as 700 lbs.

It would be interesting to know from members who have shot Bears in these hills to which of these two types their trophies belong.

Colonel Wood mentions these Bears sometimes eating carrion but says nothing about its being carnivorous which is well known. Blanford wrote :—"It is the most carnivorous of the Indian bears, and not only kills sheep, goats and even cattle and ponies, but occasionally feeds on carrion." With regard to hybernation the same author remarks :—"Some observers state that black bears hybernate, whilst Adams declares they do not. The fact is doubtless, as stated by Kinloch, that they do not hybernate completely as *U. arctus* does, but that they remain in a state of semitorpor, often in a hollow tree, during the cold months, moving about and feeding a little on milder days." What is the experience of our shikaris ? *(Editor)*].

(To be continued).

Sambo, the Malayan Bear.

His mother had met with a fatal accident so I brought him home. His eyes had evidently only opened a few days previously, as even then they were not full open, and very red and beary they looked. His nose, mouth, and, in fact, the whole snout were hairless and very pink, ridiculously like a young pig's. Two or three teeth, including the canines, were just showing. His head was quite unlike the flat one of the Sloth Bear, being round with a domed forehead, and rather prominent compared to the rest of his body ; his ears were very small. His coat was more furry than hairy, and of an even texture, though rough of course. It was markedly unlike the scraggy, unkempt coat of the Sloth Bear. His whole body was a compact mass of bone and muscle, with very bandy fore-legs, ending in large paws armed with terrific long claws, even at that age. He was unable to walk much, and appeared to be too young to be either frightened or fierce.

His thirteen year old mistress christened him Sambo, and took up her duties as foster-mother very seriously. After some experimenting, a bit of rag, screwed up into a long cigarette, was found the most satisfactory means by which he could draw up his principal source of nourishment, cow's milk diluted with a little water. He showed his cheerful appreciation of the rag-cigarette by enthusiastically absorbing very large quantities of milk, and looking more like an inflated furry ball than ever before.

In about fifteen days, he was big and strong enough to scurry about the house, and there was hardly a corner which he had not swept clean of cobwebs with his face, and not a single chair up which he had not climbed and toppled off. In a month he knew, and was on terms of friendship with, every member of the house, including Sandy, the Mroong dog (a very near relation of the Red Wild Dog) and Billy, the Goat. He knew his sleeping basket and promptly, at dusk, started to croon himself to sleep, shoving a fore-paw into his mouth, and sucking it with much vigour and splashing, was a regular accompaniment to the lullaby, and each break in his placid slumber was punctuated with his gurgling croon. His growth was rapid, and his teeth had all appeared in a short time, and a very business-like set they were. His diet was now bread and milk, all kinds of fruit, with a goodly supply of sweets, which his foster-mother carefully set apart for him. He knew the latter wonderfully well, and was never so happy and frolicsome as when with her. In his manners he was the gentleman beyond reproach and never a cross word, look, or bite did he give anyone.

Restless, and full of fun though he was, he had his contemplative moods too, and of an evening, while his foster-mother and grandmother, and the Old Un sat on a bench overlooking the Karnafuli River down below, enjoying the view and the evening breeze, Sambo would sit, very much

at ease, on somebody's lap, and look up at the large white clouds sailing along the sky. Now and then, as a particularly large one came along, he would stop cuddling his toes with his fore-paws, and would screw up his snout in a strained and long twitch waving an alarmingly long and prehensile tongue, while he put his fore-paws out as far, and as high, as he could, obviously in a manful effort to get hold of a piece of the tempting white cloud. He never appeared to tire of this ruminative performance, and there could be little doubt that, in his small eyes, it seemed that wonderful sheets of succulent cream eluded his paws and tongue, and sailed past in most unaccountable manner.

In intelligence, Sambo was far ahead of any of the varied wild pets that have, from time to time, honoured us with their company. In almost a few days he had learnt his name, and no matter how busy he was in chewing "Immediate" files, a call of Sambo from any of us, and specially from his foster-mother and grandmother immediately brought him to the bears stance of "Tention", and he would drop his fore-paws, rise on his hindlegs and look round to see what was wanted. A second call, and he would come at full gallop, rising up as he came to the caller. Very intelligent too was he in discovering that the big, leather-bound volumes on the open bookshelves fell, with a most delightful clap, when hooked with his long claws and jerked out. Quickly too he found that retribution generally followed the performance, in the shape of a cuff from the Old'Un, and, as soon as he heard foot steps, during a book-toppling seance, he promptly scurried off, and, unfailing, took refuge under a secretariat table, where, with the wall to protect his back from all attack from the rear, he sat on his tail, spread out his legs in front and held the fort against all comers, boxing off all efforts to get a grip on him, and, only surrendering when the Old'Un came and unsportingly picked him up bodily. Another wonderful game, all the more enjoyable and thrilling because a sound cuffing was the declared punishment,

was the stealthy climbing of a bath-room window from outside, the dip into the big tub of cool water, with lovely spluttering somersaults in it, if time and solitude permitted, to be followed by a dripping climb into one of the delightfully soft, clean beds, and a delicious roll in it, with the coverlet, sheets, and pillows in one gorgeous confusion with wet Bear!

In about six months, Sambo became the size of a large spaniel, and weighed the best part of fifty pounds. Finding that there was nothing left to explore inside the bungalow, he discovered that the cliff over the river, was a fine place for exploration and retreat at all times, with a large stock of not to be sneezed at edibles, in the various fruit trees and ant heaps. Besides, climbing up and down the steep cliff was a fine game, and then again to climb up a tree on the cliff-face, sit in a convenient fork, after a good lunch, and watch the dug-outs in the river down below, and the sailing clouds up above, was undoubtedly, more soul satisfying than to be with unappreciative men-folk, who pored and worried so unnecessarily over sheets of tasteless paper tied with red tape, or disrespectful women-folk who sat with funny little baskets out of which they took lovely little reels of coloured stuff, which were put back again carefully after a short piece, like a long hair, had been worked into a tiny, thin, shiny thing, that was far sharper and more prickly than any thorn in the jungle on the cliff. One could almost hear him soliloquising. "Funny folks these humans. Not without their good points, of course, but hardly up to the Malayan Bear standard!"

Gradually it came to be quite the recognized thing for Sambo to be told to 'go' after breakfast, and off he went to the cliff, and disappeared from general view. Now and then he would be seen going along from branch to branch of a tree or on the ground, busily investigating grubs and beetles far down the cliff. A call of 'Sambo' brought him up, in less

than a minute, for lunch, and then off again till about 4 P.M. when he would climb up and come on the family, at tea, on the lawn near the cliff. The gift of a biscuit, or a bit of cake, was acknowledged with about a dozen rapid somersaults, and some real, instinct-taught dancing, executed with all the manner of pirouettes and capers, all on the hind-legs, the forepaws clutched at the back of the head. Then followed the best game of the day and, for about an hour, Sambo, Sandy, the Dog, and Billy the Goat, held the lawn, romping, boxing, butting and galloping madly, while we humans looked on, overcome with laughter at the antics of the three strange friends. In all the biffing and butting and tweaking, there was never a growl or snarl or bite or kick No game in the world could have been more sporting, or played in better spirit. And so to bed.

There were variations of course. There was the afternoon when, coming up for the usual biscuit and dance and romp, a bewildered Sambo walked into a tea-party, with a Big man and a Kind Lady seated in the midst. Some of the more timid folk were feeling just a trifle scared when Big Man came along, and, introduced to Sambo, who not to be out done in politeness, immediately put out a very clawy paw to be shaken. Later in the evening, at the request of Kind Lady, a very sleepy Sambo was taken out of his basket and brought in to a lit up room, where he promptly clutched Kind Lady's finger with his paw, and, using the other one as a slobbery soother, noisily crooned himself to sleep again cuddling up at Kind Lady's feet.

After over a year's stay with us, Sambo travelled down to Calcutta making many friends on the steamer. In Calcutta he went to live with some of his own folk at the Zoo, where he was welcomed by the authorities as the only one of his family there, and given a large room all to himself, with bars all round. To a knowledgeable bear, very useful these bars were for climbing and looking over to the Tiger

house, and calling the inmates of that house names. Next door to him was a cousin of his about his own age, of the Sloth family, so there was plenty of opportunity for chat and back chat.

Every few months a call of 'Sambo' brought him out with a rush, to welcome the Old'un or Foster-Mother and Grand-Mother. Their visits were marked with much mutual rejoicing and indulgence in barley-sugar, with a hand-in-hand walk outside the house. He never failed to recognize them and his long and loud wails, when they had to leave and he was put back into his room, are sad memories.

At the Zoo we must leave him, and perhaps some of you may meet him some day. He is 'At Home' from 6 A.M. to 6 P.M. and a handful of sweets will be much appreciated.

S. K. GHOSH, I.C.S.

FISHING IN INDIA AND IN EUROPE.

By

COLONEL H. S. WOOD, I.M.S.

(*Continued from page 120*)

A year later I was fortunate to accompany a punitive expedition to Chussand also in independant territory, but further south than Somrah. We were to punish Thongu the Kuki chief for some raids into Manipur territory. The marches were very strenuous and difficult. Thongu surrendered a number of guns but I fancy the choicest ones were hidden in the jungle. As I knew Manipuri very well I acted as interpreter and made great friends with the chief. He was a great hunter and his hut was covered with trophies of the chase, Bison, Rhino, Tsine, Deer, etc. He offered me his pipe but I only had one pull at it as it was green tobacco with a nasty odour. We had *Zu* to drink, a kind of beer made from some sort of

millet. We had a long chat about Natural History and shikar. Afterwards he said *Aiga* (Manipuri for "My Lord") you and I are fond of hunting, come and live here and marry my daughter. The damsel, very coy, was introduced, she was quite a nice looking girl. However I was not prepared to resign my commission and settle down to jungle life and become a Kuki so I had to decline the honour. I I liked the Kuki chief very much and was sorry to say good bye. I gave him a pocket knife as a souvenir.

The Kukis make their own gunpowder; with the exception of the charcoal it is all made from human ordure and urine, this supplying the sulphur and saltpetre. It is in grains very much lighter than owr gunpowder as it is not polished with graphite ; it burns slowly and is not strong but they use enormous charges in their crude gune. The Kukis are nomadic and do immense harm to the forests by their system of *jhooming*. They are inveterate trappers and hunters and after a time all animate things disappear in the neighburhood of a Kuki village. They keep herds of very fine *Gayal*, the milk of which they do not drink as they look upon it as an excrement. They are very superstitious and do innumerable *pujahs* to the gods, *i.e.*, rivers, forests, thunder, etc. As trackers I defy even a Bhil or a Sonthal to compete with them and their knowledge of the jungle with all its denizens, trees and flora is as complete as it can be. I always had Kuki trackers during the seven and a half years I spent in Manipur.

The Kukis like some other Nagas are nicotine drinkers and below their pipes is a receptacle which collects the nicotiue mixed with saliva. The women also smoke and collect their nicotine for their men folk. I was told the reason they took it was because it warded off hunger and gave them energy when tired; also that it kept off malaria. I can quite believe this as the quantity of nicotine that must circulate in their blood must be deadly to the

malarial parasite. The nicotine is kept in little bamboo bottles. My trackers used to frequently take it. This nicotine drinking seems to have no detereorating effect on the system except that it pigments the skin, the skin of an addict to nicotine drinking having a complexion approaching the colour of a good, old, seasoned meerschaum.

Two interesting incidents, connected with fishing, occured while I was in Assam. The first one was when McCabe, the D. C. of the Garo Hills, was fishing from a steep bank of the Sumasri river. He heard a sound behind him and, to his horror, saw a rogue Elephant standing over him. Before he could do anything the rogue hurled him over the bank. Fortunetaly for McCabe he, stuck in some jungle and on search being made he was extracted with many bruises and a few ribs broken. He said "well nothing but an earthquake will kill me", his presentiment came true as he was killed in one in Shillong. He was a splendid fellow one of the old school, a thorough saheb, sportsman and administrator.

The other incident was when F. was fishing the Sona Rupa in Tezpur. He heard a noise to his right and a little behind him ; on looking round he was astonished to see a Black Panther squatting on its haunches. F. had no rifle so went on fishing and the Panther then strolled slowly to the river, swam across it, sprang on to the opposite bank, gave himself a shake and and walked slowly in to the forest. F. said it was a lovely sight and he only wished he had had his rifle instead of his rod. The Panther held its head high in the water shaking it vigorously to prevent the water getting into its eyes, the same as a Tiger does.

Curiously enough on the eve of despatching an article on Indian Fishing for the Journal, I saw a letter from Mr. A. S. MacDonald asking for information under this head, so I am writing further on the points not dealt with.

Transport.—As will be gathered from my account the place *par excellence* is the Hurry river and its tributary the Rowai. These rivers are in the N. E. portion of the district of Sylhet, very near the Khasia Hills' boundary. Sylhet is easily reached from Calcutta by train to Goalundo and then by steamer to Chandpur ; then from Chandpur to Sylhet by train. From Sylhet send kit and servants by boat to Kalagool Tea Estate and yourself proceed by motor or gharry to Salutikar, which is about 5 miles from Sylhet. Ask the Manager of the Jafflong Tea Estate to kindly send his motor boat for you to Salutikar and this will take you up to Kalagool in a few hours. The Manager of the Kalagool Tea Estate should be asked to arrange for boats to take you to the Hurry—Rowai junction. Pitch your camp on the hill on the right bank of the Hurry and the Mauzadar of a village called Pesadooar, which is about a mile up, will arrange for boats and men for daily fishing. It would be advisable to get a *perwana* from the D. C. of Sylhet and also to call on the Forest Officer. In these days, thanks to some missionaries, transport is difficult and one must make one's own *bandobust* but cigarettes, tobacco, rum, and opium, if procurable, go a long way to help in these matters and the Khasias will be found good fellows.

There is any amount of big and small game in these parts and at Burghat there are many Serow but this needs fitness and dangerous and difficult climbing. One can move camp, providing the water has not fallen much, to the higher reaches of the Rowai to tap virgin water. For this a folding boat of some sort is necessary, I found a Ford very good. The camp should be pitched at Mauprang, as there are grand pools above this full of Mahseer. The Rowai and Hurry localities are very healthy and the scenery is magnificent. Above Burghat there are grand places but very difficult to get at owing to the precipitous cliffs on either side. Here I have seen huge Mahseer lying under the large boulders.

The Ponatite is the next best place. This is also in the Sylhet district lying in the N. Western portion of the Sunamganj sub-division. Proceed by steamer to Sunamganj. In the earlier part of the winter, before the water in the *Khals* has dropped, it is possible to take boats right up to the Ponatite ; but a better way is to arrange for elephants at Sunamganj to take you and your kit etc. cross country. In my day the Zemindars were most obliging but it may perhaps be different now. The sub-divisional officer of Sunamganj afforded me the greatest help so it would be well to write to him. The *Bheels* and marshy ground between Sunamganj and the Ponatite swarm with duck, snipe and golden plover so a gun is very useful. Dng-outs will have to be arranged for at the Ponatite. A very comfortable way of reaching this river from Sunamganj is to get the loan or hire a budgerow from some Zemindar. In this case no tent, bed, etc. are necessary as one can live in it quite comfortably ; the servants living in *bashas* on the bank and a small boat can be towed behind for fishing.

The Ponatite is very unhealthy and every time I got back I got a dose of malaria in spite of taking quinine. For preference I should go to the Hurry, but for monsters then the Ponatite as it holds 40 and 57 pounders in the large pool also very large *Seetul*. There is no shootiEg actually at the Ponatite but with an elephant one can get Buffalo, Tiger, Pig, Hog-deer, Sambhur and Swamp Partridge in the Tangour Hoar not very far away.

To get to the Borelli in the Tezpur district one proceeds by rail to Gauhati and then by steamer to Tezpur and then by the Balipara Railway to Balipara. The manager of the Chandwar Tea Estate will, no doubt, be glad to help anyone to get to his Estate which is almost on the bank of the river and also supply boats. In my day a dear old man Uncle Curtis was the manager. He put me up, as all planters do, and gave me much enjoyable fishing. Possibly there is now a

rest-house at Chandwar where one could put up, or, with the permision of the Forest Officer, one could stay at the Forest Bungalow, but this is some distance from the river. There are ideal camping places on the river and one could shift there to get higher up. There used to be Buffalo, Rhino and Bison shooting all round the. Borelli, all this may have changed since my day but I expect the Mahseer fishing is as good as it was from 1910 to 1912. The locality is very healthy and the scenery beautiful.

Mr. MacDonald is welcome to quote from my article, with the consent of the Editor. I, myself, hope to publish a book some day in which this article will be included.

The Dragonfly Fauna of the Darjeeling and Jalpaiguri Districts and Sikkim.

BY

LT.-COL. F. C. FRASER. I.M.S., F.R.E.S.

PART 1.

The cradel of insect life, and indeed of all organisms, was probably pitched somewhere in the region comprising Bengal, Assam and Upper Burma. In no part of the world at the present day do we find such an intense fauna, so great a variety of insect life and such vast colonies of insects as in these districts. Sikkim and Darjeeling have long been noted for their glorious butterflies and these are equalled by many other orders, not least among which are the *Odonata* or what are commonly known as "Dragonflies".

Most people are able to recognize a dragonfly on sight but it is possible to confuse them with other nearly related insects. Thus I am frequently sent specimens of ant-lions and may-flies in mistake for their near relations dragonflies. In the former insects, the antennae are very noticeable objects, being often clubbed like those of the butterfly; in the dragonfly, the antennae are so small as to be seen with difficulty and then only by means of a hand-lens.

Apart from these insects there are few others which are at all likely to be confused with dragonflies. This brings us to the question—"What is a dragonfly"? and it is desirable to define it as concisely as possible.

A Dragonfly is an amphibious insect spending its early life, which may run to as long as three years, in a watery element. The more archaic species, which are usually the rarest, breed for the most part in jungly streams, whilst the more modern once have adapted themselves to civilized conditions and breed mostly in paddy fields or irrigation tanks apart from natural lakes.

The adult insect emerges directly from the larva, there being no resting stage comparable to the pupa or chrysalis

of a butterfly. Its body is made up of a large head consisting mainly of two very large compound eyes which may be in contact or considerably separated. The head is pivoted on the thorax which is in two sections, a prothorax which does duty as the neck of the insect and carries the head and the anterior pair of legs, and the main or synthorax which carries four wings and the two posterior pairs of legs.

The wings in the suborder *Zygoptera* are held close together, erect over the back when at rest; they are never folded up in any way. In the other suborder *Anisoptera*, they are held horizontally out when at rest or they may be held with a strong downward slope. In the former suborder there are a few exceptions to the rule, thus in the genus *Philoganga*, the wings are held horizontally open as in the *Anisoptera*, whilst in many species of the *Lestidae*, they are held partially open when the insects are at rest.

The legs are made up of two basal segments, the coxa and trochanter, and three terminal ones, the femur or thigh, the tibia or shin, and the tarsus or foot, the latter of which terminates by two strong claws. The body of the dragonfly terminates by a ten segmented abdomen and this portion of the insect's anatomy is subject to many variable shapes. It may be of extraordinary slimness and length, or it may be thick, broad and short. It may be cylindrical, triquetral, fusiform, flattened or compressed or may be expanded in parts. The sexual organs are carried on the abdomen, those of the male being situated beneath the 2nd segment, whilst those of the female lie below the 8th to 10th segments. When depositing eggs, the female may merely drop her eggs into water or she may insert them into the tissues of water plants by means of a robust ovipositor. A few drop their eggs in dry earth, in dried up nullahs where the first freshet will wash them down into adjacent tanks or streams. Lastly a few species lay their eggs on foliage overhanging water, where the newly hatched larvae drop plumb into their watery element.

The wings are membranous organs built up on a framework of nervures or veins which have been given names or numbers as shown in the accompanying figures. These nervures are analagous to those found in other insects; the membrane is quite naked however and quite innocent of scales such as are found in butterflies and moths, thus they may be handled with impunity without fear of rubbing off the colours. Although in most dragonflies the membrane of the wing is colourless, yet in some it is tinted with the most magnificent hues and shades, some of the Darjeeling species being among the most beautiful insects found in the world. Lastly, before closing this short description, it is necessary to say that dragonflies are very variable in size, some being not more than an inch long or in expanse, whilst others may be measured in many inches and take a place amongst the giants of the insect world.

Dragonflies are not difficult to identify by means of suitable keys and in order to facilitate this work I have given below, first, a glossary of terms used, which, in working the keys that follow, must be constantly referred to until the terms used are mastered. Secondly a few figures which will serve to explain the nervures of the wings, etc., and lastly the keys themselves.

The keys are divided into four parts which deal respectively with the suborders, families, subfamilies and genera and species. The two latter are combined, as in many cases the genera are monotypic or represented in the areas under discussion by a single species only. In places where it has been thought to be helpful, a few extra notes have been added in parenthesis after individual species.

The keys contain only those species which are found within the Darjeeling and Jalpaiguri districts—so that any which may be found not to fall within these, will probably be new additions to the fauna of the districts.

Explanation of Text figures.

FIG. A. Wings of an Anisopterous dragonfly.

A. The arc. *Aban*. Accessory basal antenodal nervure. *An*. Antenodal nervures. *Br*. The Bridge. *Bs*. Basal space. *C*. Costal nervure. Costa or Costal border of wings. *Cn*. Cubital nervures. *Cs*. Cubital space. *Cuii*. One of the main longitudinal nervures. *Dc*. Discoidal cell. *Df*. Discoidal field, the area enclosed by the nervures *MA*, *Cuii* and the outer border of the discoidal cell, *IRiii*. One of the intercalated or accessory longitudinal nervures. *IA*. One of the main nervures, the one lying nearest the base of wings. *M*. Membrane. *MA*. One of the main nervures. *Mn*. Median nervures. *Pn*. Postnodal nervures. *Pt*. The pterostigma. *Ri,Rii,Riii,Riv+v*. Main longitudinal nervures of the wing, the first known as the *Radius*. *Sa*. The sectors of arc. *Sc*. The subcostal nervure. *St*. Supertriangle. *N*. The Node. *Al*. The Anal loop, found in the hindwing only and in the present figure made up of eight cells. It is the area enclosed by the nervures *Cuii,IA* and a nervure descending from the discoidal cell.

FIG. B. Wing of a Zygopterous dragonfly, belonging to the *Coenagriidae*.

Ab. The anal bridge. *Ac*. The anal crossing, a short nervure running to the posterior border of wing or to *Ab*. *Arc*. The arc or arculus. *Dc*. The discoidal cell (shown shaded). *IA*. The most basal of the main longitudinal nervures. *MA*. One of the main nervures. *N*. The Node. *Pns*. Postnodal nervures. *Pt*, The Pterostigma. *Ans*. Antenodal nervures. (Only two in number in this subfamily.) *Ri*, *Rii*,

Riv+v. Main nervures of the wing, the first known as the *Radius*. *Sc.* Subcostal nervure. *Cuii.* One of the main nervures. *IRiii.* An intercalated or accessory longitudinal nervure. *C.* The Costal nervure or border, or the Costa.

FIG C. Wing of a Zygopterous dragonfly, belonging to the *Agriidae*.

Ab. The anal bridge. *Ac.* The anal crossing. This short transverse nervure sometimes meets the posterior border of the wing instead of *Ab*. *Ans* Antenodal nervures. *Arc.* The arc or arculus. *Bs.* Basal space sometimes traversed by nervures known as the median nervures. *C.* Costa or costal border of wing. *Csp.* Costal space. *Cuii.* One of the main nervures of wing. *Dc.* Discoidal cell (shown shaded). *Df.* Discoidal field. *IA.* One of the main nervures of wing; it is a continuation of *Ab*. *IRii.* An intercalated nervure, which are usually numerous in the *Agriidae*. *MA.* Another main nervure of the wing. *N.* The Node. *Pns.* Postnodal nervures. *Pt.* The pterostigma. *Ri.* The Radius. *Rii,Riii,Riv+v* and *R+M.* Main nervures of the wing. *Sn.* Subnode. *Sc.* Subcostal nervure.

FIG. *a.* Head of a Zygopterous dragonfly. Note that the eyes are set wide apart. On their inner side are the so-called *postocular spots* found in many of the smaller dragonflies.

a. Antennae. *c.* Clypeus. *f.* The frons. *e.* The eyes *l.* The labrum, or upper lip. Between the antennae are three small accessory eyes known as *ocelli*.

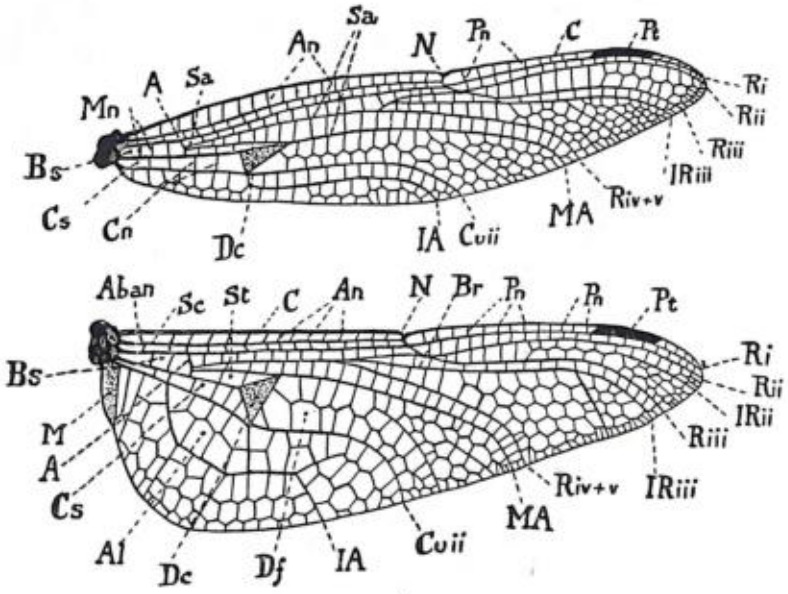
FIG. *b.* Head of a Gomphine dragonfly. Note that the eyes are set rather wide apart although not nearly

so much so as in the Zygoptera. The head is seen from the front and above.

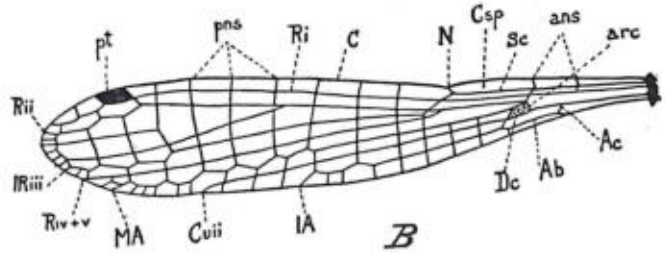
a. Antennae. *c*. The clypeus. *e*. The eyes. *f*. The frons. *l*. The labrum or upper lip. *o*. The occiput.

FIG. *c*. Head of an Anisopterous dragonfly. Note that the eyes are here broadly contiguous and that the occiput is correspondingly small. The head is seen from the front and above.

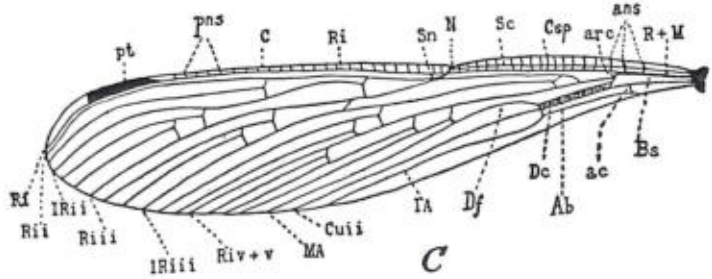
a. The antennae. *c*. The clypeus. *e*. The eyes. *f*. The frons. *l*. The labrum. *o*. The occiput.


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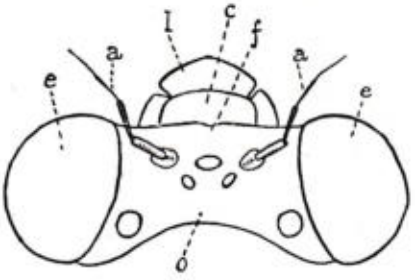
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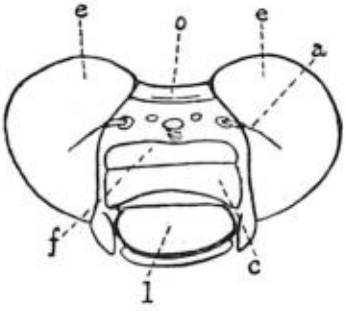
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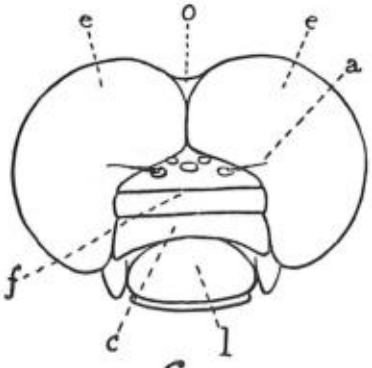
C



a



b



c

Glossary.

Ab. The *Anal Bridge*, a nervure running from the posterior border of the wings in the Zygoptera and continued on as the nervure *IA*. It is rudimentary in genus *Drepanosticta* where it ends by joining the underside of the discoidal cell, and it is quite absent in the genus *Protosticta*. It is usually met by the short nervure *Ac*, either at the wing border or shortly after its origin, in which case the nervure *Ac* joins it instead of the hinder border of wing. (See *Ac.*)

Abdomen. The hinder part of the body of a dragonfly which contains the digestive organs. In dragonflies it is made up of ten segments. The second segment contains the genital organs of the male, the 8th to 10th those of the female. Segment 2 usually bears special markings on its dorsum which are useful for identification; segment 7, in the males, often has a prominent marking on its dorsum known as a "recognition mark", whilst segment 10 ends by carrying the anal appendages. The segments nearest the thorax or trunk of the insect are known as the "basal segments", whilst those at the opposite end or end of abdomen are known as the "anal" or "distal" segments.

Ac. The *Anal Crossing;* a short transverse nervure near the base of the wings which meets the nervure *Ab* at the wing border or shortly after the origin of the former. In the Anisoptera it constitutes one of the cubital nervures, or nervures crossing the cubital space. In the genera *Drepanosticta* and *Protosticta* there is an accessory *Ac* found very close to the base of the wing proximal to the usual *Ac.* (See *Ab.*)

Anal Loop. Found only in the Anisoptera. It is a collection of cells bounded by well-defined nervures situated

at the base of the hindwings bounded in front by the nervure *Cuii*. It is absent in many genera but very prominent in all the *Libellulidæ*, *Aeschnidæ*, *Cordulegasteridæ* and many of the *Gomphidæ*. It is shaped like a stocking in most of the *Libellulidæ* but more compact and quadrate in the other families. In the former it is made up of two rows of cells with a prominent midrib but may be of three or more rows in the other families. In the genera *Tholymis* and *Zyxomma* the sides of the loop are continued to the posterior border of the wing, a condition known as an "open loop."

Antehumeral stripe. A coloured stripe on the dorsum or back of thorax situated near to the middle suture of the thorax or internal to the shoulders of the thorax. (See *humeral.*)

Antenodal nervures. The transverse nervures running from the costal or anterior border of wing to the nervure *Ri* or Radius internal to the *node*. In the *Coenagriidæ* there are only two of these, which are known as the "primary nervures" and which are found in many of the higher forms as specially thickened nervures, quite easily distinguishable from the others (Note the wing of one of the *Gomphidæ*, etc.) In the other families they are numerous, ranging from six in *Libellago* to an enormous number in *Neurobasis*, etc. The anterior half of each nervure usually coincides with the posterior half traversing the costal and subcostal spaces respectively. In the Zygoptera the antenodal nervures invariably coincide and the same applies to the Libellulidæ but in all other Anisopterous genera they fail to coincide.

Apical. The tip of the wing or abdomen or the end of each abdominial segment nearest the tip of the abdomen.

Apex of wing. The tip of the wing.

Arc. A short, oblique transverse nervure at base of wings extending from *Ri* to *Cuii* and forming the outer boundary of the basal space.

Basal incomplete antenodal nervure. An antenodal nervure found in a few species of dragonfly of which the anterior half in the costal space is missing. This nervure is always nearest to the body of the insect when it is present. In the genus *Philoganga* there are usually two present. It is an important specific character.

Basal segments. Those abdominal segments situated nearest the body of dragonfly.

Basal space. A space at the extreme base of the wing lying internal to the arc which forms its outer boundary. It is bounded by *Cuii* behind and *Ri* in front. Usually it is entirely free from nervures but in some genera, such as *Neurobasis* and *Chlorogomphus*, it is traversed by one or more nervures.

Base of wing. The part lying nearest to the body of the insect.

Bicolorous. Two coloured.

Borders of wing. The dragonfly wing is triangular, the anterior or costal border, the posterior border and the base which lies nearest the body.

Bridge. A longitudinal nervure lying just posterior to the node which forms the inner portion of the nervure *IRiii* and is limited externally by a short oblique nervure in continuation of the node. In the keys it represents the triangular space bounded by *IRiii* behind, the base of *Rii*

and nervure descending from the node in front. In the *Anisoptera* this space is usually traversed by a single nervure but in some genera it is traversed by several, an important generic character. It should not be confused with the nervure *Ab* or *Anal Bridge*, which see above.

Cells of wing. The reticulation or areolets forming the network of the wing. These may be four, five or even six-sided.

Compressed. Flattened from side to side.

Costal border. The anterior border of the wing.

Costal nervure. The nervure forming the anterior border of the wings.

Costal space. The anterior space of the wing internal to the node, bounded by the costal nervure in front and the subcostal nervure behind.

Cubital nervure. Transverse nervures traversing the cubital space. In the Coenagriines and in many of the Anisoptera there is only one, the nervure *Ac.* In others they are usually multiple.

Cubital space. The space at the extreme base of the wing lying immediately internal to the discoidal cell. It is traversed by one or more nervures.

Discoidal cell. In the Anisoptera this is a triangle situated near the base of the wing and lies between the cubital space and the discoidal field. The triangle, which is easily picked out from the surrounding nervures, may be similar in shape or entirely dissimilar in fore—and hind-wings. In the Zygoptera it is four-sided, elongated and

squared or pointed outwardly. This space may be free or traversed by one or more nervures. Its base lies nearest the trunk of the insect and may be in line with the arc or situated more or less far to its outer side.

Discoidal field. The area of the wing external to the discoidal cell, which is bounded by this cell internally, the nervure *MA* anteriorly, the nervure *Cuii* posteriorly and the border of the wing externally. This field begins with one or more rows of cells in the Anisoptera and its sides are parallel or divergent or convergent at the border of the wing.

Distal. The part farthest removed from the body ; the end of a limb.

Divaricate. Spreading outwardly so that the apices of any organ are more far apart than the bases.

Dorsum. The back or upper side.

Entire. Not divided up by nervures. A space in the wing is entire when not traversed by any nervures.

Eyes. The eyes of a dragonfly are large and compound and two in number. They are separated in the *Zygoptera* and *Gomphidae* but more or less confluent over the top of the head in all others.

Femora. The thigh. The third segment of an insects leg. The dragonfly's leg is made up of the coxae, trochanter, femur, tibia and tarsus. The femora is furnished with spines which are often of a specific nature and useful for identification.

First antenodal nervure. The basal complete antenodal nervure. It is one of the two primary antenodal nervures.

Foramen. A small aperture or hole.

Forking of sector of arc. (See *sectors of arc*). The superior sector of the arc forks into two at a variable distance from its origin, the lower end of the fork being the nervure *Riv + v.*

Frons. The forehead. It is strongly angulated in the Anisoptera but not very evident in the Zygoptera. It is moderately noticeable however in the genus *Ceriagrion.*

Fusiform. Spindle-shaped.

Humeral. Pertaining to the shoulder. A term applied to a coloured stripe situated on the shoulders of the thorax.

IA. The final longitudinal nervure of the wing situated near the base and posterior part of the wing.

Incomplete basal antenodal nervure. (See *basal incomplete antenodal*).

Imago. The fully fledged or adult insect.

Incomplete outer antenodal nervure. In many of the *Libellulinae* the last antenodal nervure situated next to the node is complete only in the costal space. It is a generic character of some importance in the keys.

Inferior anal appendage. An appendage situated on the hind and lower part of the tenth abdominal segment.

It is often of marked specific shape and simple, bifid or intricate in form.

IRiii. One of the longitudinal accessory or intercalated nervures of the wing terminating near its apex. (See fig.)

Labrum. The upper lip.

Longitudinal nervures. The main nervures of the wing running from the base to apex or posterior border of wings.

MA. One of the main longitudinal nervures which runs from the upper outer angle of the discoidal cell to the posterior border of the wings.

Middorsal. In the centre of the back.

Nervures. The supporting framework of the wings.

Neuration. The network of nervures in the wings.

Node. An artificial joint situated on the costal or anterior border of the wing at a variable distance from the base; in the *Zygoptera* it is much nearer the base than the apex of the wings, but in the *Anisoptera* it is roughly at the centre of the costal border about midway between the base and apex of wings.

Ovipositor. A large number of dragonflies insert their eggs into the tissues of plants floating in water and this is performed by the female by means of a robust spine situated beneath the terminal segments of the abdomen. All the Zygoptera possess this organ but only the more primitive species of the *Anisoptera*.

Posterior angle of the discoidal cell. The angle nearest the posterior border of the wing.

Posterior lobe of prothorax. The prothorax is described as made up of an anterior, middle and posterior lobe; the latter is shaped like a collar or the lappet of a coat and is variably shaped in different species of dragonfly.

Postnodal nervures. Short transverse nervures running between the costal border of the wing and the Radius (*Ri*) after or external to the node.

Prothorax. The thorax or trunk of a dragonfly is made up of two portions, the anterior of which is known as the prothorax and corresponds to the neck of the insect, as it carries the head. The anterior pair of legs are also affixed to it beneath. (See *posterior lobe of prothorax.*)

Pruinescent. Many adult dragonflies become coated by a thin layer of bloom, like the bloom on a damson or mango. This entirely obscures the markings in very old specimens and gives them a more or less uniform bluish or violaceous colouration. It is generally confined to the males but even in these may be confined to certain areas of the body such as beneath the thorax, or on the dorsum of the head, thorax or terminal segments of the abdomen.

Pulverulent. Pruinosed. (See *pruinescent.*)

Pruinosed. Pulverulent. (Which see).

Pterostigma. A small chitinized or horny opaque organ situated at or near the apex of the wings between the costal border and the Radius (*Ri*). It may be absent in one or

both sexes or in the anterior wings. It varys much in shape in the families and genera and may take on specific characters.

Riv+v. One of the main longitudinal nervures of the wings. It is in continuation of the upper or superior sector of the arc.

Ri. The *Radius* or main longitudinal nervure of the wings from which branches off many other longitudinal nervures, *Rii,IRii,Riii,IRiii, Riv+v.*

Riii. One of the longitudinal nervures of the wing which runs in continuation of the oblique nervure descending from the node.

Second antenodal nervure. The outermost of the two primary antenodal nervures found in the Coenagriines.

Sectors of arc. Two longitudinal nervures which take origin from about the centre of the arc, the superior of which runs outward and branches or forks near the node. The inferior or posterior one terminates at the outer anterior angle of the discoidal cell. Between these two nervures a variable number of short transverse nervures pass, the number of which constitutes an important character in separating the *Gomphinæ* from the *Epigomphinae.*

Segments of abdomen. The abdomen of a dragonfly is made up of ten segments, the genitalia of the male being carried on the underneath of the second segment from the base, and that of the female beneath the 8th and 9th.

Spatulate. Shaped like a spatula or the paddle of a canoe.

Stalked wings. In many of the primitive dragonflies, such as all the Coenagriines, the wings are definitely narrowed at the base, this narrowing continuing as far as the level of the beginning of the nervure *Ab* (Anal bridge), which point will give the length of the stalk of the wing.

Subcostal space. The space lying posterior to the subcostal nervure.

Subcosta. A longitudinal nervure running from the base parallel to and immediately posterior to the costal border of the wing and terminating at the node.

Superior anal appendages. The upper pair of appendages attached to the end of the terminal or tenth segment of the abdomen. They are often of definite specific shape.

Suture. A joint in the thorax or abdomen.

Thorax. The trunk of the dragonfly. It is made up of two parts in these insects, a prothorax or small part which carries the anterior pair of legs, and a larger, more massive portion which carries the four wings on its dorsum and the two hinder pairs of legs beneath.

Tibia. The shin of the leg or the fourth segment of same. It is furnished with spines or hairs on one aspect but in the Corduliines and Chlorogomphus males it has a narrow membranous keel which is of generic value.

Transverse nervures. The short transverse nervures crossing the wing in the direction from costal border to hinder.

Ventral. Beneath the abdomen or thorax.

Ventral plate. A plate situated beneath the tenth abdominal segment in the females of the *Aeschnidae,* which bears short or long spines. It is used to dig into the plant or ground so that the insect can get some purchase to drive its eggs home with the ovipositor.

(To be continued.)

A forthcoming book on shikar.

We wish to draw the attention of all our members to a book by Colonel H. S. Wood, I.M.S. entitled "Memories of Shikar" published by Messrs. Witherby & Sons, 326, High Holborn, London. Price 10 shilling and 6 pence.

The Author's name is well known to the readers of our Journal as he has been our mainstay for a number of years and his instructive and interesting articles have appealed to all of us. He was a mighty Nimrod during the many years he was in India and it is needless to say that his first hand knowledge about all game and its shikar is unlimited, due to his great powers of observation and keen interest in the habits of all our living creatures. This fund of knowledge he is now placing at the service of all in this interesting volume. If any further tribute was necessary the name of Witherby as publishers, is sufficient to guarantee both the interesting nature of the book and the general get up of the same.

This book will appeal, we are sure, to all whether they be big game hunters, fisherman or naturalists. Order your copies early it is sure to be good money's worth. *Verb sap !*

[*Editor.*]

DARJEELING NATURAL HISTORY SOCIETY.

The Society was started about the end of 1923, the objects being to maintain the Museum in a proper condition; to promote the study of Natural History and to get together, as complete as possible, collections of Natural History specimens from a limited area, including "the civil districts of Jalpaiguri and Darjeeling and the State of Sikkim", as well as what could be procured from the neighbouring countries of Tibet, Bhutan and Nepal.

The Government and Municipal grants not being sufficient for our purpose, it was proposed to enrol members so as to increase our funds, and a Quarterly Journal has been started. It is hoped that everybody will join the Society and co-operate to make the Museum and Journal a success.

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CYPSIURUS BATASIENSIS INFUMATUS (Sclater).
The Eastern Palm-Swift with nest in thatch of roof.
4/7 Nat. size.

JOURNAL

OF THE

DARJEELING NATURAL HISTORY SOCIETY,

Vol. IX.—No. 1.

Game Birds of Sikkim, including the Darjeeling District, and of the Jalpaiguri District, Bengal.

By

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

(*Continued from page 134 of Vol. VIII.*)

(40). The Red-breasted Hill-Partridge.

Arborophila mandellii Hume.

"Crown dark chestnut, shading into brown on the nape; sides of the neck and cheeks rust-red, spotted with black; feathers of the black olive-brown, margined but not barred with dusky; eyebrow-stripes grey; throat and fore neck rust-red, *divided from the rich chestnut chest by a white and black band;* breast and belly grey." (*Ogilvie-Grant, in Lloyds Natural History*). Sexes alike.

"Iris brown to red-brown; bill black; legs reddish." (*Stuart Baker*).

The cock measures :—"Total length 11 inches, wing 5.4" (*Ogilvie Grant. Cat. B. M. XXII.*)

The hen measures :—Total length 10 inches, wing 5·1" (*Ogilvie Grant. Cat. B. M. XXII*).

The distribution according to Stuart Baker is "Hills North of the Brahmaputra from Sikkim and Bhutan to

Eastern Assam. Bailey obtained it in the Upper Dibong Valley and Needham in the hills above Sadya."

The type specimen was collected by Mandelli's collectors in the "Western Bhotan Duars". Since then Mandelli's collectors obtained a number of skins, eleven are given in the British Museum Catalogue. All these were from Sikkim and collected in February. March, April, October and December. Waddell remarks in the Sikkim Gazeteer :—"My two birds were got well within Sikkim—the first below Tendong at an elevation of about 5,000′ in December and the second near Gangtok about 4,000′ in January." We have never been fortunate enough to locate this handsome Hill-Partridge nor did Bailey ever come across it in Sikkim. Stevens, however, while collecting for an American Museum located it in Sikkim. He wrote to us as follows :—This Partridge "was located *to the east* of Lingtam towards the Bhutan frontier and did not occur around Lingtam where *rufogularis* only occurred. I could show you the exact place on the map. Only one was secured but had I stayed on, which was out of the question then, more would have been located I feel sure. To get on to the ground of *A. mandellii* you have to *cross the river* to the east of Lingtu or Lingtam." We hoped to locate it in the Duars on the hills near Buxa but the Rufous-throated birds were the only Partridges we found.

There seems to be practically no information about this rare Hill-Partridge. Bailey who recorded it from the Dibong Valley gives no information about it. All we can find are notes by Stuart Baker which we quote. "The Red breasted Hill Partridge is found principally between 3,000 and 6,000 feet, descending a good deal lower in the Cold Weather, though it never seems to come actually into the Plains. In the summer it must often ascend much higher than 6,000 feet, for the nest taken for me in the Chambi (Chumbi) Valley could not have been lower than 8,000 feet, and may

have been a good deal higher. In some nests taken by Mr. H. Stevens at altitudes a good deal over 6,000 feet, I found feathers of this bird used in the lining on several occasions." The same author, elsewhere remarks :—"The Abors knew it and said they habitually snared them in summer on some hills above Sadya which ran between 8,000 and 10,000 feet. It was obtained at over 7,000 feet in the Mishmi country and Macdonald trapped it at 8,000 feet in the Chambi (Chumbi) Valley. It appears to be a rare bird, keeping to dense evergreen-forest."

With regard to its nidification Stuart Baker writes :— "My collectors sent me four eggs with the skin of a female, trapped on the eggs which were taken on the 3rd June in the Chambi (Chumbi) Valley at an elevation of about 8,000 feet. The eggs were laid on a pad of grass nnder shelter of a rock in evergreen-forest composed of oak—and rhododendron trees, the ground very steep and rugged, much split up into small ravines and very wet and humid. The eggs measure about 44·0 × 34·4 mm. and are probably rather unusually large."

(To be continued).

The Occurrence of the Eastern Palm-Swift

[*Cypsiurus batasiensis infumatus* (Sclater)]

in the Darjeeling District.

(With a Coloured Plate.)

I discovered this bird breeding on Glenburn Tea Estate at 3,300 feet through a casual conversation with a headman, to whom I was explaining the different kinds of swifts and swallows. On investigating his "very small kind that makes nests in the thatch of the coolies houses." I was astonished to find a colony of Palm-Swifts breeding within a mile of my bungalow. I had occasionally, noticed small swifts in the air but had taken them to be the Himalayan Swiftlet.

The original colony consisted of about 35 pairs of birds which had distributed their nests over a group of five coolie houses, and the coolies said that the birds had always bred there since they could remember. This was in May 1931. Early in 1933 three of the houses were burnt down but two other houses have been built on and the colony, still about 35 pairs, is distributed over four houses.

The birds arrive in March and as soon as the cotton seeds are ripe in April, begin nesting operations at once. The nest is made entirely of cotton down and glued together with saliva and fixed to the straggling thatch hanging down from the edge of the house. Only those houses are used in which the roof runs the whole length of the house, and is not cut off each end to roof verandahs making the roof four-sided. Two eggs and often three are laid and as many as three broods are brought up from one nest.

The measurements of 12 eggs average 18·2 × 11·7 mm. The breeding season lasts from April to the beginning of August, after which the birds disappear entirely from the district until the following March. Both birds appear to assist in the incubation changing places frequently during the day.

The nest is just a rim of saliva and down and both eggs and young ones look very insecure in the nests which seem to be built at an angle of 45°.

The birds are very tame and take no notice of the inhabitants of the houses, and can easily be caught, on the nests, after dark.

Measurements of 5 specimens (unfortunately unsexed) were as under :—

Wing ...	... 116 – 122 mm.
Tail ...	... 60 – 61 mm.
Depth of fork in tail	... 20 – 24 mm.

One pair of birds with nest and eggs was sent alive to Mr. Inglis of the Darjeelieg Museum for identification and mounting.

NAMRING T. E. W. H. MATTHEWS.
Darjeeling District,
8th August 1933.

[Stuart Baker gives the distribution of this Palm-Swift as "Assam South of the Brahmaputra and East of the Dibong; Manipur, Lushai Hills, Burma from the Chin and Kachin Hills to the extreme South, Malay States, Sumatra, Borneo, Java, Shan States, Yunnan, Siam and Hainan." The same author writing about their habits in Assam says:— 'Generally speaking those of the races but the bird, though breeding in villages, is a jungle bird and even if it likes open spaces, cultivated fields, etc. to hawk over for insects, prefers such of these as are surrounded by forest. It is a very tame little bird and passes in and out of the Naga houses within a few inches of the inhabitants." In the Malay Peninsula it, apparently, never builds its nest in the thatch of houses. The late Mr. Robinson wrote in :" *The Birds of the Malay Peninsula Vol. I page 127.*" "In the Malay Peninsula the nests are attached to the under surfaces of palm leaves of the loftier species, usually *Borassus* or *Livistona*, or *Areca*. I have not seen them on coconut leaves. Nests obtained by Mr. Scimund on 5th July 1924, attached to the under surface of the leaves of a *Livistona* palm in the public gardens, Taiping, Perak, are comprised of the floss of a thistle-like seed, mixed with dark winged seeds, but with no feathers, compacted with the saliva of the bird. The nests have no lining. The area of attachment of the nest to the leaves is large, measuring $2\frac{1}{2}$ by 2 in. but the nest itself is a bisected oval, about $1\frac{3}{4}$ in. long by $\frac{3}{4}$ in. wide. The external depth is about 1 in. and the hollow for the reception of the eggs about 0·4 in. The nests contain either one or two eggs, which are white, glossless, very pointed

ovals. Average dimensions, about 0·7 by 0·45 in." It ranges up in the hills in the Malay Peninsula as high as 4,000 feet. In Burma they also often make use of palms for nesting purposes and also, sometimes, do the same in Assam. With regard to the position of the nests, in the thatch Stuart Baker writes:—"it is built on one of the lower layers of grass or bamboo-leaves forming the thatch; over this hang the upper layers. It is always placed at the end of a tunnel in the thatch, sometimes a few inches long only, sometimes a couple of feet. Very rarely it is made in the straggling thatch hanging down from the edge. Mr. Matthews nests were, I understand, all made in the straggling thatch hanging down from the edge. The average of fifty eggs is given by Stuart Baker as 17·1 × 11·7 mm. He gives the breeding season as from April to June in the Hills and from early March to August in the plains but our Hill birds seem to breed much later than given by him. Mr. Matthews kindly showed me his colony but the birds were absent, some of the nests were touching each other.

Editor.]

BEARS AND THEIR SHIKAR.

By

Colonel H. S. Weod, l.m.s.

(Continued from page 147 of Vol. VIII.)

2. THE SLOTH BEAR.

As compared with the Black Bear this animal is ungainly and uncouth. It has a long snout like a pig, large lips and very long claws; the eyes too are extremely piggish.

This is the common Bear of the plains both in Assam and other parts of India; it is never found at any great altitude. The food of the Sloth Bear consists of grubs,

white ants and wasp larvæ. It is not keen on fruit like the Himalayan Black Bear but will ascend *ber* or *goolur* trees if easy to climb. Its walk is very ungainly, with a rolling, shuffling gait. In habits it is nocturnal, during the day lying up in some dense thorny jungle and in ground we call *Karkhani* in Assam, ground cut up into innumerable hillocks and nullahs by the action of water and the work of earthworms and termites; terrible stuff, even for an elephant, as it stumbles at nearly every step on account of the innumerable ridges and depressions. Strange to say although so common in Assam I never bagged a Sloth Bear. I once had a good chance of doing so but was forestalled, the night before I arrived, by an Assamese who sat in a machan, which was made for me, and shot a huge male when it came to feed on the *ber* fruit of the tree on which the machan was situated.

The young Sloth Bear is not as docile as the young Black Bear. It is a nasty tempered little beast with a wicked eye and will flex one paw against its chest ready to strike.

Once I was sitting up for Tiger over a live buffalo calf when a wild Buffalo, a Boar and a Sloth Bear came to investigate the tie-up. They all gave it a sniff or two and deparated; the calf did'nt seem perturbed in the very slightest.

In Ceylon during the dry season, sitting up over a water-hole is a sure way of bagging this animal. G., a well known Ceylon shikari, told me that one night no less than seven Bears visited a water-hole. He was sitting up for a Tiger so let them all go without firing a shot.

[Pocock allows one species and one subspecies of the Sloth Bear.

Melursus ursinus ursinus, Shaw.

Distribution. Peninsuar India from Cape Comorin northwards to Gujerat, Assam and the foothills of the Himalayas."

Melursus ursinus inornatus, Pucheran.

Distribution "Ceylon".

The latter is said to differ from the typical race in being shorter coated than Indian specimens.

Rowland Ward gives the record Sloth Bear as length of *skin* 7 ft. 9 inches; the next, length from nose to tip of tail 7 ft. 1 inch. The largest from our area is one owned by F. A. Bruce Cowley shot in the Darjeeling Terai which measured 6 ft. 7 inches and weighed about 550 lbs.

Blanford gives an interesting note on the habits of this Bear compiled from various writers and his own observations. We give this in *extenso*.

"The Sloth Bear is still one of the commonest wild animals of India, though its numbers have been greatly diminished by sportsmen throughout the country, and in some districts, as in parts of the Deccan and in Bengal, where it was common 30 or 40 years ago, it has been exterminated. Wherever it occurs its presence is shown by the holes it digs to get at termites, by marks of its claws on trees that it has ascended for honey, and by its peculiar tracks.

These animals are generally found solitary or in pairs, or three together; in the latter case a female with two cubs, often nearly or quite full-grown. Occasionally four or five are met with in company. They inhabit bush and forest-jungle and hills, and are particularly fond of caves in the hot season and monsoon, and also when they have young. Throughout several parts of the peninsula of India there are numerous hills of a kind of granitoid gneiss that weathers into huge loose rounded masses. These blocks remain piled on each other, and the great cavities beneath them are favourite resorts of bears, as in such places the heat of the sun, and some of the insects (flies, mosquitoes, &c.) that are

most troublesome in the monsoon, can be avoided. In the cold season, and at other times where no caves are available, this animal passes the day in grass or bushes or in holes in the banks of ravines. It roams in search of food at night, and, near human habitations, is rarely seen in the day time; but in wild tracts, uninhabited by man, it may be found wandering about as late as 8 or 9 o' clock in the morning, and again an hour or even more before sunset in the afternoon. In wet or cloudy weather, as in the monsoon, it sometimes keeps on the move all day. But the Sloth-bear, although, like most other Indian animals, it shuns the midday sun, as might be expected from its black fur, and it appears far less reluctant to expose itself at noonday than the tiger is. I have seen a family of bears asleep at midday in May on a hill-side in the sun. They had laid down in the shade of a small tree, but the shade had shifted wihoout their being disturbed. It is scarcely necessary to observe that this bear does not hybernate.

Owing to its shaggy coarse fur, its peculiarly shaped head, its long mobile snout, and its short hind legs, this is probably the most uncouth in appearance of all the bears, and its antics are as comical as its appearance. Its usual pace is a quick walk, but if alarmed or hurried it breaks into a clumsy gallop, so rough that when the animal is going away at full speed it looks almost as if propelled from behind and rolled over and over. It climbs over rocks well, and like other bears, if alarmed or fired at on a steep hill-side, not unfrequently rolls head over heels down hill. It climbs trees, but slowly and heavily, the unmistakable scratches left on the bank showing how often its feet have slipped back some inches before a firm hold was secured. I cannot, however, confirm the statement of some observers that this animal only ascends trees with rough bark; unless I am greatly mistaken I have seen its scratches far up the smooth stems of *Kowá* trees (*Terminalia arjuna*)

The food of the sloth-bear consists almost entirely of fruits and insects. Amongst the former the jujuba plum or *ber (Zizyphus jujuba)*, the fruits of the ebony tree *(Diospyros melanoxylon)*, *jamun (Eugenia jambolana)*, *bel (Ægle marmelos)*, and of various kinds of figs, especially *bar* or *banyan (Ficus indica)* and *gular (F. glomerata)* the pods of *Cassia fistula*, and the fleshy sweet flower of the *mhowa (Bassia lotifolia)* are much eaten by these animals, each in its season, but many other wild and cultivated fruits are devoured when procurable. Beetles and their larvæ, the honey and young of bees, and above all the combs of termites or white ants furnish food for the Indian bear. In their nocturnal rambles these animals visit many fruit-trees, sometimes climbing amongst the branches to shake down the fruit, or standing up and dragging it down with their paws ; they also turn over stones to search for insects and larvæ, ascend trees to plunder bees nests, and dig out the nests of white ants, sometimes making holes 5 or 6 feet deep for this purpose. These holes are easily recognized by the marks of the bears' claws.

Tickell says (and his views are confirmed by others) :— "The power of suction in the bear, as well as of propelling wind from its mouth, is very great. It is by this means it is enabled to procure its common food of white ants and larvæ with ease. On arriving at an ant-hill the bear scratches away with its fore feet until he reaches the large combs at the bottom of the galleries. He then, with violent puffs, dissipates the dust and crumbled particles of the nest, and sucks out the inhabitants of the comb by such forcible inhalations as to be heard at two hundred yards distance or more. Larvæ, especially the large ones of the *Ateuchus sacer*, are in this way sucked out from great depths under the soil".

In Southern India bears are fond of the fermented juice of the wild date-palm, and climb the trees to get at the pots

in which it is collected. The animals are said at times to get very drunk with palm-juice. They are very fond, too, of sugar-cane, and do much damage to the crops; they also occasionally eat various pulses, maize, and some other kinds of corn, and cultivated fruits such as mangoes.

Acording to Tickell, they rob birds' nests and eat the eggs. I have never heard an authenticated case of their killing larger animals for food, and as a rule they do not touch flesh; but Sanderson records an instance in which a muntjac that had been shot and left in the jungle was partly devoured by one, and he says that they often gnaw dry bones of cattle. McMaster also relates how the body of a bullock that had been killed by a tiger was pulled to pieces and devoured by two large bears. Young cubs reared in confinement eat flesh readily, cooked or raw.

The bears have a peculiar habit of sucking their paws and of making a humming sound at the same time, and the present species is much addicted to the practice. According to Tickell some tame young bears that he saw would suck any persons hand in the same manner as their own paws.

The eyesight of *Melursus ursinus* in by no means good, and it has a peculiarly comical way of peering about for intruders, that gives the idea of its being short-sighted. Its hearing is also, I believe, far from acute. Its sense of smell is much better; by scent it can detect honey-combs in a tree over head, and nests of termites or larvæ of beetles at some depth below the surface of the ground. In smelling about for food, for instance in visiting fruit-trees at night, it makes a peculiar puffing sound that can be heard at a considerable distance.

Except in puffing and humming, the Indian bears are quite silent animals as a rule, and have no call for each other. Occasionally, however, they make the most startling noise, whether connected with pairing or not I cannot say, I have

only heard it in the beginning of the cold season, which is not their usual pairing-time. They occasionally fight under fruit-trees, but I think the noise then made rather different.

When surprised or disturbed, and especially when wounded, a fight generally ensues, which Sanderson considers due to an attack by the unwounded animal or animals; but this is not necessarily the case, as I have seen an old female when hit attack two halfgrown cubs that were with her, and cuff them heartily, and in one instance, when both of two bears were hit, they stood up on their hind legs and fought till one dropped dead from the bullet-wound.

As a rule the sloth-bear is a timid animal, but occasionally it attacks men savagely, using both its claws and teeth, and especially clawing the head and face. Sometimes, especially when surprised suddenly and attempting to escape, a bear merely knocks a man down with a blow of its claws, often, however, inflicting severe wounds; but in other cases it holds its victim with its claws and bites him severely, not leaving him until some time after he ceases to struggle. Many of the most savage attacks are made by female bears that have young with them, some are by wounded animals, but occasionally the onslaught appears quite unprovoked. The story of sloth-bears hugging is, I think, unknown to the natives of India, and is only repeated by those whose ideas on the subject are derived from European folk-lore.

There are, however, many folk-lore, stories connected with the Indian bear. It is a common belief in parts of India that male bears abduct women. It is possible that the name of *Adam-zád* is connected with this story. The same belief exists in Baluchistan regarding *U. torquatus*.

Sportsman in India generally either drive patches of jungle or hills, and shoot the bears as they run out, or else mark them down in the morning, and go up to their lair

on foot. Elephants are seldom used, they have a great dread of bears, and are but rarely steady with them, and the country is frequently too rough and rocky for the sport. When bears inhabit hills, sportsmen occasionally post themselves before daybreak in a commanding spot, and intercept the animals on their return from their nocturnal rambles. Bears are occasionally speared from horseback, and have sometimes been hunted with large dogs and killed with a knife when seized. This is described by Sanderson. Jerdon gives an account of a curious method of hunting with dogs, practised by the Polygars, among the hills in the extreme south of the Peninsula. When the bear is brought to bay, the hunters each thrust a long bamboo loaded with strong bird-lime into the shaggy coat of their quarry, and thus hold him firmly. Nets have also been employed.

A wounded bear usually escapes without attempting to fight, and unless he can get into a cave, runs away until he drops, no matter what the temperature may be, frequently going many miles. Occasionally, however, he charges desparately, but a shot in the face, whether it hits or not, will almost always turn him. There is a common idea, quite unfounded, that a bear always rises on its hind legs to attack, and may then be shot in the chest. It very rarely, if ever, does this when really angry and assailing an enemy already clearly recognized. The act of rising on the hind legs is generally due to surprise, and to an endeavour, on the part of the bear, to make out his enemy better.

The pairing time appears to vary, but is generally about June, at the commencement of the monsoon. The period of gestation is said by Tickell to be seven months; if so it rather exceeds that of other bears. The young are born at various times from October till February, but most often in December or January; they are usually two in number, the size of Newfoundland pups, are blind for the first three weeks (18 days according to McMaster), and

examine and report on it. He returned on the 2nd and beamingly announced "*Thunny fusta irakadhoo*" which, interpreted, means the water is all O. K. Carriers were arranged and a note sent over to J. telling him to come over to my bungalow which was the starting point. He arrived at 5 P.M. on the 3rd and, like all anglers, was full of hope and day dreams of 60 pounders. We had a final overhaul of tackle and camp gear and made all arrangements for an early start on the morrow. I had chosen J. as my companion knowing him to possess the right temperament to render his company pleasant even when, as so often happens in fishing, called upon to face disappointment when more than pleasantly tired. This quality in him is, as it is in most cases, due to his appreciation of beauty, in every form, combined with a keen sense of humour. After an early dinner we sat down to enjoy a smoke and discuss Mahsir fishing. A lull in the argument as to the respective merits of greenheart and split cane rods caused me to glance at the time; Heavens! OHO as they say in the army and we had to start at 5 sharp; so we tumbled into bed and were soon asleep. Hardly had this happened than I was awakened by the rattling of tea cups near my ear and looking at my watch I saw it was 4·20. My bearer, a very useful and willing servant, is not to be relied on to serve tea at unusual hours; frequently in his anxiety to be punctual he determines not to sleep, with the result that I have to rudely awake him from deep sleep an hour after the appointed time which is most annoying. On this occasion, however, he was in time, so, being kind-hearted, I poured out a cup of tea and placed it within J's reach before awakening him. He awoke, yawned and stretched himself so nicely that his elbow went into the cup upsetting it and him badly. His language was appalling but I refrained from criticising him when I remembered the following story. "A curate of rather puritanical views on religion was asked to take part in some local theatricals in aid of "the Fund for furs for savage

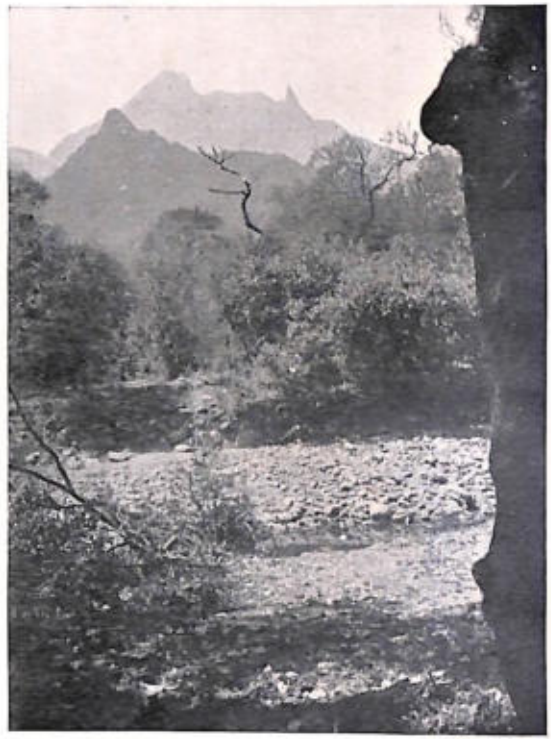
are covered with soft, short hair, which after a couple of months becomes rougher and coarser. After a time (2 or 3 months I believe) the mother takes them with her, carrying them on her back, where they cling to the long hair. They ride thus, at times, until of tolerable size; one cub may sometimes be seen following its mother whilst the other is carried. They take between two and three years to reach maturity, and generally remain with the mother till full-grown. Sloth-bears have been known to live in captivity for 40 years. They are, when taken young, easily tamed, and, although fretful and querulous at times, generally playful, amusing, good tempered and much attached to their masters."

We have quoted this in full because in certain points the observations are at variance with those of Colonel Wood and also it touches upon some habits not mentioned by that naturalist. (EDITOR)].

(To be continued).



A Rocky Precipice on the Nilgiri side of the Valley.



The Nilgiri Slopes from the Valley.

AN ATTEMPT AT ANGLING

By

C. PRIMROSE.

(With illustrations.)

It has oftened annoyed me to hear people, who know little about it, confidently assert that "Coffee planting on the Nilgiris is a gentleman's life". Of course my idea of a gentleman may be quite different to theirs,in fact, I fancy it must be, seeing I do not agree with their sweeping statement. That there are many more trying means of keeping the wolf from the door I freely admit but the salaries paid to Coffee planters are too low to permit of them indulging in the luxuries associated with "a gentleman's life". If the Coffee planter happens to be, like myself, a keen angler, the genteel part of his life is still less apparent to him, the reason being that when fishing conditions are at their best he is busy harvesting his crop and it is impossible to obtain leave. When all important works are completed and he can safely ask for leave the rivers, owing to the S. W. Monsoon, are filled to the brim with a liquid closely resembly pea soup in colour and consistency, which, for Mahsir fishing, is useless. So while the keen angler can earn a living by Coffee planting, the Coffee planter, if a keen angler must perforce forego his favourite sport and where is the gentility in that ?

However it sometimes happens that the dry spell between the S. W. and the N. E. Monsoons lasts long enough to allow the rivers to clear for a few days before the latter Monsoon dirties them again. J. and I decided to try our luck for a week during this period and to reduce the chances of disappointment, we ascertained the condition of the river before going to it. The S. W. Monsoon stopped on the 22nd September and on the 30th I sent Gooja, a native who had been taught what good Mahsir water should be, to

Bushmen" or some equally good charity. At a certain juncture of the play he was to be shot by the villain and clapping his hand to his breast, in much alarm, to exclaim "By God I am shot". The idea of such profanity so shocked his religious scruples that he refused to act, stating that nothing would make him take the Lord's name in vain. After much discussion among the promoters of the play it was decided that a compromise might be reached by the Curate using Jove instead of God and so the rehearsals went on. All went well until the first night when some wag rammed a raspberry into the villain's pistol. The curate when fired at gasped realistically and clapping his hand over the smarting spot exclaimed "By Jove, I am shot" and then removing his hand and seeing the purple stain on it said still more loudly "By God I am". Well J. is only a parson's son so surely he may be excused his fluent Billingsgate. We started in the early dawn with the coolies, carrying their loads ahead of us, silhouetted against it and the cool air of this best of hours in India blowing the smoke from our pipes back into our faces and who can be anything but happy under such conditions.

(To be continued)

The Dragonfly Fauna of the Darjeeling and Jalpaiguri Districts and Sikkim.

BY

F. C. FRASER, LT. COL., I.M.S., F.R.E.S.

PART II.

(Continued from page 177 of Vol. VIII.)

Order—ODONATA.

PART I.—SUBORDERS.

Wings held close together when at rest (except in some species of the *Lestidæ* in which they are held half-open and *Philoganga* where they are held fully open): the base of hindwing not broader than that of fore; the hindwing usually broadest near its middle; eyes invariably separated ... *Zygoptera.*

Wings held wide open when at rest; the base of the hindwing much broader than that of the fore and this part usually the broadest part of the wing; eyes always more or less in contact (except in the *Gomphidæ*) ... *Anisoptera.*

PART II.—FAMILIES.

Zygoptera.

Only 2 antenodal nervures in the wings .. *Coenagriidæ.*

Never less than 5 antenodal nervures in the wings ... *Agriidæ.*

Anisoptera.

1. All the antenodal nervures in the costal and subcostal spaces coinciding; discoidal cells very differently shaped in the fore and hindwings and situated at different distances from the arc ... *Libellulidæ.*

The antenodal nervures in the costal and subcostal spaces coinciding rarely; discoidal cells of similar or very similar shape and situated at equal distances from the arc ... 2.

2. Eyes well separated ... *Gomphidæ*.

Eyes confluent over the head ... *Aeschnidæ*

Eyes only just touching over the head ... *Cordulegasteridæ*.

PART III.—Subfamilies.

Coenagriidae.

1. The nervure *IA* absent and *Cuii* markedly reduced ... *Platystictinæ*.

The nervure *IA* present; *Cuii* of normal length or reduced ... 2.

2. No extra longitudinal nervures at apical end of wings 3.
Always some extra longitudinal nervures present at apical end of wings ... 4.

3. Most of the cells of wings four-sided; discoidal cell of forewing with its anterior side but slightly shorter than the posterior. ... *Platycneminæ*.

Most of the cells of wings four-sided; discoidal cell of forewing with its anterior and posterior sides of the same length; its outer end square. ... *Protoneurinæ*.

Most of the cells of wings five-sided; discoidal cell of forewing with its anterior side much shorter than the posterior; its outer end pointed ... *Coenagriinæ*.

4. The nervures *Riv+v* and *IRiii* arising nearer to the node than arc ... *Megapodagriinæ*

The nervures *Riv+v* and *IRiii* arising nearer the arc than node or about half-way between these structures 5.

5. The nervure *Cuii* at its origin from the discoidal cell, strongly arched forwards ... *Synlestinae.*

The nervure *Cuii* at its origin from the discoidal cell but slightly arched forwards ... *Lestinae.*

Agriidae.

1. The front of head markedly produced into a nasal-like structure ; abdomen much shorter than the wings ; the pterostigma narrow and elongate in both sexes (but absent in the forewings of *Libellago lineatus lineatus*) ... *Libellaginæ.*

The front of head oblique and depressed ; abdomen equal to or longer than the wings ... 2.

2. The sectors of arc arising from the middle or from above the middle of arc ; anterior side of discoidal cell straight ; this cell shorter than the basal space ; the pterostigma present and of the same shape in both sexes ... *Epallaginæ.*

The sectors of arc arising from below the middle of arc ; anterior side of discoidal cell convex forwards ; this cell equal in length to the basal space ; pterastigma absent or present and usually variable in the seves ... *Agriinae.*

Libellulidae.

The hindwings of both sexes strongly rounded at the base ; the tibiæ without a membranous keel on the inner side ; thorax very rarely metallic ... *Libellulinæ.*

The hindwings of the males strongly angulated at the base ; the tibiæ of males with a membranous keel on the inner side ; thorax partly or wholly metallic ... *Corduliinæ.*

Gomphidae.

Only 2 transverse nervures between the sectors of arc as far as the forking of the upper sector in the forewing, usually only 1 in the hind ... *Gomphinæ.*

More than 2 transverse nervures between the sectors of arc in the forewing as far as the forking of the upper sector ... *Epigomphinæ.*

Aeschnidae.

The nervure *Riii* making an abrupt bend forwards near the apex of wings; the nervure *IRiii* not bifurcated before the level of the inner end of pterostigma; female evipositor with only minute spines ... *Anaxinæ.*

The nervure *Riii* without an abrupt bend forwards near apex of wings; the nervure *IRiii* bifurcated before the level of the inner end of pterostigma; female ovipositor with short spines ... *Aeschninæ,*

Characters similar to the last but the female with 2 or more long conspicuous spines on the ovipositor ... *Gynacanthaginæ.*

Cordulegasteridae.

The basal space traversed by one or more nervures; tibiæ of male with a membranous keel; the ovipositor of female quite inconspicuous, not produced ... *Chlorogomphinæ.*

The basal space free of nervures; tibiæ of males without a membranous keel; the ovipositor of female enormously produced ... *Cordulegasterinæ.*

PART IV.—GENERA AND SPECIES.

Suborder Zygoptera.

Platystictinae.

The nervure *Ab* present as a short nervure running from the posterior border of the wing to underside of discoidal cell ... *Drepanosticta carmichæli*

(Thorax reddish brown marked with azure blue on dorsum and sides; segments 8 to 10 azure blue on the dorsum.)

The nervure *Ab* absent ... *Protosticta himalaica.*

(Thorax black marked with blue laterally; segments 8 and 9 and the extreme base of segment 10 azure blue. Abdomen very long and excessively slim.)

Platycneminae.

1. The anterior side of the discoidal cell of forewing one-fifth shorter than the posterior ... 2.

   The anterior and posterior sides on discoidal cell of forewing equal in length ... (Genus *Copera*) ... 7.

2. The nervures *Ab* and *Ac* meeting at the posterior border of wing; two rounded blue spots on dorsum of thorax ... (Genus *Coeliccia*) ... 3.

   The nervure *Ab* extending inwards beyond the level of *Ac*; no blue spots on dorsum of thorax ... (Genus *Calicnemis*) ... 4.

3. The thorax entirely black beneath ... *Coeliccia renifera.*

   The thorax entirely blue beneath ... *Coeliccia dorothea.*

4. The head entirely black beneath ... *Calicnemis pulverulans.*

   (Black powdered with bluish white).

   The head black beneath, marked with yellow ... 5.

5. Abdomen bright vermilion red without markings *Calicnemis eximia.*

   Abdomen red marked with black ... 6.

6. Segments 1 and 2 blood red, the rest black ... *Calicnemis mortoni.*

   Segments 1 to 5 red, the rest black; only 15 postnodal nervures present ... *Calicnemis miles,*

   Segments 1 to 7 blood red, the rest black; 20 postnodal nervures present ... *Calicnemis miniata.*

7. The two hind pairs of tibiæ of male white and widely dilated ... 8.

The two hind pairs of tibiæ yellow, reddish or brown; only moderately dilated or not at all ... 9.

8. Hind femora extending nearly to end of segment 2; inferior anal appendages curved strongly downward ... *Copera annulata.*

(The 2nd abdominal segment entirely black on dorsum).

Hind femora short, extending only to the end of thorax; inferior anal appendages quite straight ... *Copera superplatypes.*

(Two blue spots on dorsum of 2nd abdominal segment.)

9. Superior anal appendages only one-fourth the length of inferiors *Copera marginipes.*

Superior anal appendages at least half the length of inferiors *Copera vittata.*

(Newly emerged specimens of these two species are pure white marked sparingly with black, but the adults are black with yellow, brown and bluish markings.)

Protoneurinae.

Neuration of wings closely similar to that of *Copera* but the sides of discoidal cell more nearly equal; superior anal appendages shaped like the butt end of a revolver ... *Caconeura o'doneli.*

(An entirely black species, but the newly emerged imago with a white stripe on the sides of thorax.)

Coenagriinae.

1. The arc at the level of the outer antenodal nervure ... 2.

The arc situated external to the level of the outer antenodal nervure ... 14.

2. The nervures *Ab* and *Ac* meeting each other on the hinder border of the wings ... 3.

The nervure *Ab* meeting *Ac*, the latter not coming into contact with the hinder border of wings ... 11.

3. No black markings on the head, thorax and basal segments of the abdomen (Genus *Ceriagrion.*) ... 4.

Black markings on head, thorax and basal segments of abdomen ... 5.

4. Whole of head, thorax and abdomen azure blue ... *Ceriagrion azureum.*

Whole of head, thorax and abdomen lemon yellow ... *Ceriagrion coromandelianum.*

Whole of head, thorax and abdomen olivaceous ... *Ceriagrion olivaceum.*

Whole of head, thorax and abdomen pale sulphur yellow, the terminal segments of abdomen black above ... *Ceriagrion fallax.*

Abdomen bright red at the base and anal ends, black on the dorsum in between ... *Ceriagrion cerinorubellum.*

5. Pterostigma of the forewing larger than that of the hind; abdomen usually very long and slender; female with a ventral spine beneath segment 8 ... (Genus *Aciagrion*) ... 6.

Pterostigma of the same size in fore and hind-wings; abdomen proportionately shorter and less slender; female without a ventral spine beneath segment 8 ...(Genus *Pseudagrion*) ... 8.

6. Ground-colour palest brown without black markings; obscure bluish markings on the thorax ... *Aciagrion pallidum.*

Ground-colour blue with black markings ... 7.

7. Large species with abdomen more than 30 mm in length ... *Aciagrion olympicum.*

(Segment 2 has a small triangular black mark on the dorsum, whilst segment 10 is blue with a black cross on the back.)

Smaller species with abdomen less than 25 mm in length ... *Aciagrion approximans.*

(Segment 2 is broadly black on the dorsum, whilst segment 10 is entirely black.)

8. Face and front of head bright orange ... *Pseudagrion rubriceps.*

Face and upper surface of head blue or greenish blue marked with black ... 9.

9. Thorax pale greenish blue with three fine black lines on the middorsum of thorax and a thicker black one just external to these ... *Pseudagrion decorum.*
Thorax black on dorsum with two narrow blue stripes 10.

10. The superior anal appendages as long as segment 10 and furnished with a robust basal spine on the inner side. ... *Pseudagrion spencei.*

The superior anal appendages shorter than segment 10 and without a basal spine. ... *Pseudagrion bengalense.*

11. Neuration of wings close; never less than 15 postnodal nervures. ... *Himalagrion exclamationis.*

(Body colour black, conspicuously marked with azure blue, this colour forming markings on the sides of the abdominal segments shaped like a note of exclamation.)

Neuration of wings more open; never more than 11 postnodal nervures and usually much fewer than this ... 12.

12. The pterostigma of similar shape and colour in fore and hind-wings ... *Enallagma parvum.*

The pterostigma differing in shape and colour in fore- and hind wings ... (Genus-*Ischnura.*) ... 13.

13. Abdominal segments 1 and 2 metallic on dorsum; segments 3 to 6 black on dorsum.
... *Ischnura senegalensis.*

Abdominal segments 1 and 2 non-metallic on dorsum; segments 3 to 6 citron yellow, unmarked with black.
... *Ischnura delicata.*

(All the females of the last three species have a small spine beneath segment 8.)

14. Only 6 to 8 postnodal nervures in the forewings; small species with the abdomen not more than 20 mm on length. ... (Genus *Agriocnemis*) ... 15

At least 10 postnodal nervures in the forewings; abdomen not less than 30 mm in length
... *Agriocnemis rubescens.*

(Newly emerged specimens of this insect have the abdomen bright red as in *Calicnemis eximia*; in adults it turns black.)

15. The labrum or upper lip metallic blue ... 16.

The labrum non-metallic ... 17.

16. Superior anal appendages longer than the inferior
... *Agriocnemis pygmæa.*

Superior anal appendages shorter than the inferior which are very long and bear a tuft of hairs at the end
... *Agriocnemis femina.*

17. Abdomen palest blue, white in the newly emerged insect and with very restricted black markings
... *Agriocnemis lacteola.*

Abdomen dark blue with broad black markings largely blocking out the ground colour; segment 2 with two small blue spots on its dorsum ... 18.

18. Forewing with only 6 or 7 postnodal nervures; segment 7 blue with a narrow black apical ring connected by a fine black line to a middorsal squarish basal black spot. ... *Agriocnemis clauseni.*

Forewing with 8 postnodal nervures; segment 7 black with a pair of small blue basal spots only ... *Agriocnemis aborensis.*

Megapodagriinae.

The outer ends of the nervures *IA* and *MA* markedly branched; pterostigma twice as long as broad; an all black species ... *Burmargiolestes melanothorax.*

Synlestinae.

1. Body non-metallic; wings from base to pterostigma coloured blackish brown and with a white opalescent patch beyond this below the pterostigma ... *Orolestes selysi.*

Body metallic-green; wings uncoloured ... (Genus *Megalestes*). 2.

2. Thorax black beneath; 2 spines to the inferior anal appendages ... *Megalestes irma.*

Thorax yellow beneath; only a single spine to the inferior anal appendages ... *Megalestes major*

Lestinae.

1. Pterostigma square-shaped; thorax with many small black spots ... *Platylestes platystyla.*

Pterostigma much longer than broad and very narrow; thorax without black spots or if marked then these linear or irregular in shape ... 2.

2. Resting with wings closely apposed; the discoidal cell of forewing shorter and much narrower than that of the hind ... *Ceylonolestes cyanea*

Resting with wings held half open; the discoidal cell of fore—and hind-wings similar in shape Genus *Lestes* 3.

3. Thorax without metallic markings ... 4.

Thorax with metallic markings ... 5.

4. The pterostigma unicolorous ... *Lestes umbrina.*

(Body entirely without markings, palest brown.)

The pterostigma bicolorous, its costal border palest brown, its hinder border blackish brown ... *Lestes nodalis.*

(Body entirely pale brown peppered with darker brown spots; a small spot of brown at the node.)

5. Metallic-green stripes on the dorsum of thorax with a serrated outer edge. ... ... 6.

Metallic-green stripes on the dorsum of thorax, the upper end of stripes hooked outwardly ... *Lestes elata.*

6. No metallic green markings on the sides of thorax ... *Lestes præmorsa præmorsa.*

A metallic green stripe present situated just behind the stripes on the dorsum of thorax ... *Lestes præmorsa sikkima.*

(The former species is found in the plains, the latter is a montane or submontane species.)

Libellaginae.

1. Small species; only 5 to 6 antenodal nervures to the wings; forewing without a pterostigma in the male ... *Libellago lineatus lineatus.*

Larger species; antenodal nervures much more numerous than in the last; pterostigma always present in all wings of both sexes ... (Genus *Rhinocypha.*) 2.

2. A coloured triangle on the middorsum of thorax which extends less than halfway up to roots of wings and which has a similarly coloured triangle on each side of it ... *Rhinocypha biforata delimbata.*

A single coloured triangle on the middorsum of thorax which extends only halfway up to roots of wings ... *Rhinocypha unimaculata.*

(The wings a fiery coppery or golden red, the hindwing bearing a large median iridescent spot of peacock blue.)

A single coloured triangle on the middorsum of thorax which extends right up to the roots of the wings. 3.

3. The hindwings of male marked with opaque black bands ... *Rhinocypha bifasciata.*

(Wings a beautiful iridescent blue, green or lilaceous tint according to the angle of view; the apex of the hindwing black and a narrow black band about halfway from node to the pterostigma.)

The hindwings of male marked with large iridescent spots ... 4.

4. The middle band of spots confluent to form a single large irregular spot ... *Rhinocypha bifenestrata.*

(The apical spot very large; the longitudinal band on the forewing narrowing rapidly near the apex of wing.)

4. The middle band of spots split up into three spots 5.

5. The apical spot of hindwing approaching to within 2 cell rows of the anterior border of the wing; the middle spot of the middle row usually 4 cell rows in width ... *Rhinocypha cuneata.*

The apical spot of hindwing separated by 4 rows of cells from the anterior border of wing; the middle spot of the middle row only 2 cell rows wide ... *Rhinocypha quadrimaculata.*

Epallaginae.

1. The discoidal cell of both wings untraversed by nervures; wings uncoloured ... 2.

   The discoidal cell in both wings traversed by one or more nervures; wings tinted with rich amber ... *Allophæa ochracea.*

2. The costal border of wing quite straight between the base and node 3.

   The costal border of wing between base and node with a prominent hump on it ... (Genus *Anisopleura*) 5.

3. Wings with a long stalk; 4 to 5 incomplete antenodal nervures near the base of wings; resting with wings wide open ... *Philoganga montana.*

   Wings unstalked; no incomplete basal antenodal nervures; resting with the wings closely apposed ... (Genus *Bayadera*) 4.

4. The posterior lobes of prothorax bright yellow; an obtuse projection near the base of inner side of superior anal appendages; no spine at the apex of these appendages ... *Bayadera longicauda.*

   Only the outer ends of the posterior lobes of prothorax yellow; a long prominent spine near the base of inner side of superior anal appendages; a spine on the outer side of apex of these appendages *Bayadera indica.*

5. Both antehumeral and humeral yellow stripes on the dorsum of thorax; no spine on the outer side of superior anal appendages ... *Anisopleura comes.*

5. Only an antehumeral yellow stripe on the dorsum of thorax ; a prominent spine on the outer side of superior anal appendages ... *Anisopleura lestoides.*

Agriinae.

1. The basal space of wings traversed by several nervures ; hindwings of male brilliant metallic emerald green ; hindwings of female suffused with brown and with a white spot at the node and a white pterostigma ... *Neurobasis chinensis.*

The basal space untraversed ... 2.

2. Wings unstalked, their apices black or brown ; the pterostigma absent in all wings of both sexes. ... (Genus *Vestalis)* 3.

(Body and abdomen metallic emerald green).

Wings stalked, their apices unmarked ; the pterostigma present in all wings ... *Caliphaea confusa.*

(The body and abdomen of newly emerged specimens are a metallic green but adults are bright coppery).

3. The wings with their apices sharply defined in black ... *Vestalis apicalis.*

The wings with their apices illdefined in dark brown ... *Vestalis gracilis.*

(To be continued).

The Editor.

DEAR SIR,

With reference to the photograph of the young rhinoceroses which appeared in the Statesman of Sunday the 25th February 1934, it may be of interest, to the members of the Society, to learn how the one in the foreground happened to be caught and incidentally to lose her ear.

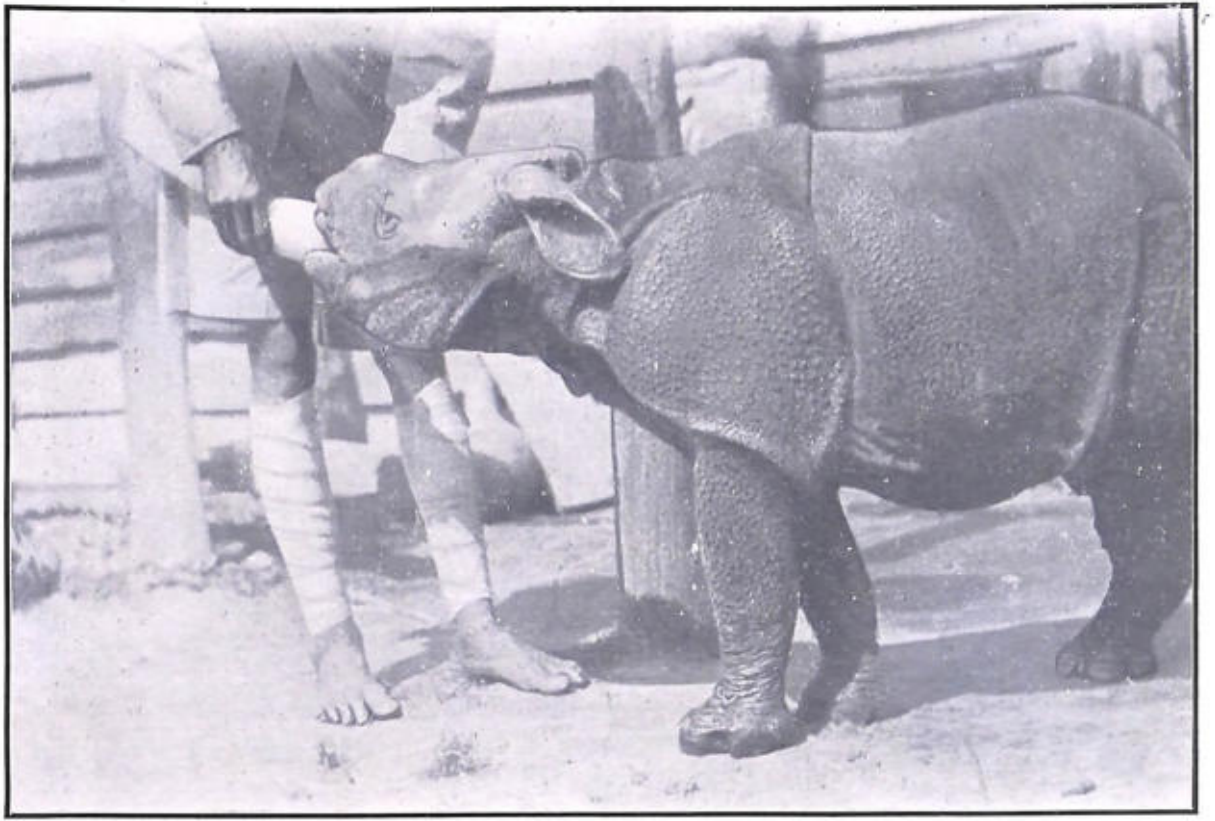
Sometime in August last some villagers near Ramshai saw an animal, which they took to be a pig, being carried down the Jaldacca, which was in flood. From humanitarian, if not culinary, reasons they plunged into the river, not without certain risk to their lives, and rescued the beast.

To their astonishment and, possibly, disappointment they found that the animal was not a pig.

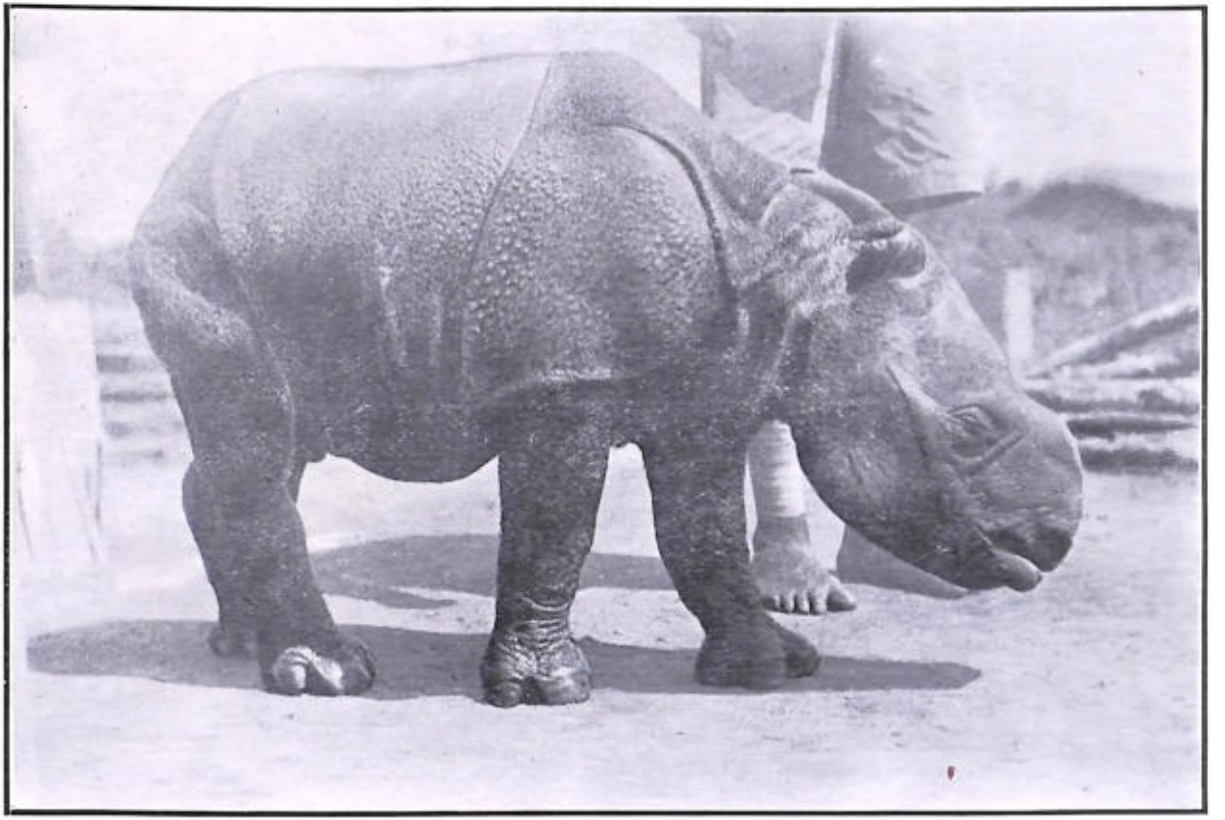
In due course the animal was handed over to the Forester at Ramshai when it was found that in addition to being half drowned, the little beast had been badly mauled by a tiger, one ear being very badly injured, besides which their were several other very nasty wounds.

She did not appear to resent her rescue and soon showed that she realized that anything out of a bottle was worth risking and proceeded to absorb from 12 to 15 seers of milk per day. This was administered in doses of three or four whisky bottles full at a time, every three or four hours.

Her wounds yielded to treatment with the exception of the damaged ear which eventually had to be amputated, but the operation in no way affected her appetite and she remained on the milk diet until November, when it was decided that she would be better looked after in the Calcutta Zoo, she was then put on to a diet of bottled rice, ghur and milk with which to wash it down.



INDIAN GREAT ONE-HORNED RHINOCEROS CALF.



INDIAN GREAT ONE-HORNED RHINOCEROS CALF.

Shortly after this she passed from my keeping, as I was transferred to another Division, I parted from her with regret as she was a most affectionate little creature, particularly if you happened to have a bottle of milk in your hand.

Like most other youngsters her table manners were deplorable, but it is hoped that as she gets older this will be remedied.

I enclose a couple of photographs taken when she was about six weeks old, one showing her damaged ear and the other absorbing a little nourishment.

W. E. HODGE, I.F.S.

REVIEW.

The Nidification of Birds of the Indian Empire by E. C. Stuart Baker, C.I.E., O.B.E., F.Z.S., etc., *Vol. II Turdidae and Sturnidae with 6 plates.* Published by Taylor and Francis, London, 31st May 1933. Price 30*s*.

We have received the 2nd volume of this most interesting and useful work and can assure our readers that it is, in every way, up to the standard of the first volume. It deals with all the families, except the *Cinclidæ*, of Vol. II of the new Fauna and also the families, *Irenidæ*, *Oriolidæ*, *Graculidæ* and *Sturnidæ* of Vol. III of that work. Of the 540 species and subspecies, of those families, known to inhabit India, 75 do not breed within our limits and out of the remaining 465 species and subspecies Mr. Baker describes the nesting of 403, so that the nesting of 62 has still to be discovered or recorded. Most of these breed in the higher Himalayas or in the extreme boundaries of East and South Burma. Some ten of these may possibly be found in our area in the hills, such as *Heteroxenicus stellatus*, *Heteroxenicus hyperythrus*, *Ianthia hyperythra*, *Phyllscopus maculipennis*, *Phylloscopus p. pulcher* etc., more information too is desirable about *Muscicapella hodgsoni*, *Callene frontalis* and *Phœnicurus schisticeps*. Masson is *said* to have found a nest of the former on the 20th July "from which the young flew when he found it. This may be correct but Masson was inclined to be unreliable where eggs were concerned. With regard to the *Callene* all that is recorded is what Blyth says in Hume's "Nests and Eggs"? "Mr. Hodgson figures the nest of the Blue-fronted Callene as domed and like a wren's, with clay-coloured eggs. There is no such figure amongst the many hundreds of original drawings (of which those in the British Museum are mostly copies) lent me by Mr. Hodgson." With regard to *Phœnicurus schisticeps* the only eggs received by Mr. Baker were from Tibet and he is not certain as to their identification.

We notice what *may* be a couple of omissions or, more probably, Mr. Baker may now have reason to have changed his mind. The Burmese Blue Rock-Thrush (*Monticola solitaria affinis*) and the Nepal Orange-barred Willow-Warbler (*Phylloscopus p. pulcher*) are not mentioned in the work under review, although in the Fauna volume Mr. Baker gives the former as breeding in Northern Burma and probably in the higher Kachin and Bhamo Hills and remarks about the latter that Mr. Wickham took two nests with eggs near Haka in the Chin Hills.

The letterpress is extremely full and interesting and written in a very happy style. Although our knowledge, through the medium of this excellent book, has increased from 55 to 86 per cent. since Oates' edition of Hume's "Nests and Eggs" was published in 1898, there still remains much to learn as noted by the author in his preface. "This, however, shows how much there is is still to be done, especially when we remember that in some cases the nidification recorded requires confirmation and that in other cases the record is that of a single nest and its contents. In the addition of finding of entirely new eggs, we have much to learn as to the range of variation, of colour, shape and size in those which are already known; length of incubation period, construction of nest, courting displays and many other points, also. still require elucidation." Even in our commonest birds there are still points to be discovered, as for example, in that common garden bird, the Tailor-bird it is not yet known, exactly, how the female makes the knots after puncturing the leaf and drawing the material through it. As this bird breeds freely in our gardens and even will make its nests in pot plants on our verandahs, this point, with a certain amount of patience, might be easily discovered. Some say what look like knots are not really knotted.

The six plates, from photographs taken by Capt. R. S. P. Bates and Mrs. Bates, are very excellent and add much

to the beauty and interest of the book. Everyone who is interested in birds should purchase this work as many interesting facts on the habits of the birds, besides the actual nidification, are given.

We are greatly looking forward to the two final volumes and must congratulate the author on the excellence and carefulness of his work and it shows the vast knowledge he has attained by years of careful and continual observation of the birds in their own haunts. [Editor]

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ORIOLUS CHINENSIS TENUIROSTRIS Blyth.

The Burmese Black-naped Oriole.

4/7 Nat. size.

JOURNAL

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Vol. IX.—No. 2.

The Orioles of our area.

By

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

(With a coloured plate).

Nine species and sub-species of Orioles occur in India but only three of these are found in our area; two of these are especially noticeable being garbed in bright yellow and black but the third one, which keeps to the forests, is not so noticeable as its colour is maroon-red and black.

They are all arboreal birds but the Black-headed Oriole does, sometimes, descend to the ground. The yellow and black species are often called "Mango birds," the same name is applied, in Jamaica, to one of the Humming birds (*Trochilidæ*). There are some North American birds to which the name Oriole is applied, but they belong to quite a different family *(Icteridæ)*.

1. The Burmese Black-naped Oriole.

Oriolus chinensis tenuirostris (Blyth).

Field identification:—A rather slender looking bird yellow in colour but greenish yellow on the back with a black band through the eyes broadening on the nape, and most of the wing and tail of that colour. Very often seen in the Duars on the shade trees in the tea during the cold weather but it also occurs in the forest.

Description:—Length about 10 inches; wing 5·9 inches and tail 3·7 inches.

There is no need to describe the plumage of this species as the coloured plate shows the male. The female is duller

and greener above and the breast is usually streaked with blackish, except in very old birds.

Bill livid pink; legs plumbeous; iris red.

The *young* resembles the female but has no band through the eye:and on the nape, the lower plumage is much paler andheavily streaked from the breast dawnwards. Oates gives the bill of a young bird as black and the iris brown.

Distribution. In our area.—In winter it is regularly found in the Duars and Terai. We have one specimen collected by Mr. Matthews on Glenburn T. E. (3200 ft.) in the hills on January 19th 1932. This is the only record for the hills, neither Stevens nor Shaw nor ourselves have ever seen it there. About the Terai Mr. Matthews writes to me :—When snipe shooting round Siliguri and Titalya I have never failed to meet with it from late September to just ten days of April. I am certain it is resident in the plains."

Outside our area :—"Breeding in the Lower Himalayas from East Nepal to Assam; Manipur; Tippera and Chittagong in Eastern Bengal; all Burma South to Tenasserim; Kachin Hills, Shan States; Yunnan and Siam. In winter in the Plains of Cachar, Sylhet, Dacca and Mymensingh." *(Stuart Baker).*

Habits, etc. :—In the Duars it is very fond of the shade trees in the tea but also occurs in the forest. Stuart Baker found them on the outskirts of oak and rhododendron forests in the Khasia Hills and in open oak forests in Cachar. Mrs. Milburne, as mentioned further on, has seen them in dense forest in Assam. All our specimens, however, have been collected on the shade trees in the tea. It also comes into compounds, Harington found many nests there at Maymyo in the Shan States. We have always seen them single or in pairs and found them shyer than the Black-headed Oriole, their flight, too, seems to be faster.

The earliest date we have of their arrival in the Duars is the 4th December *very* much later than seen by Matthews in the Terai and by the end of March they have all left there.

There seems to be nothing recorded about these birds' food but it is sure to be similar to that of the others of the genus, both fruit and insects. Mrs. Milburne has gone, very fully, into the song of this Oriole and her notes will be found, separately, at the end of this article.

May and June are the months in which it breeds. Stuart Baker writing on the nidification of this lovely bird says it "breeds in the Lower Himalayas from Nepal to Eastern Assam between the foothills and 6,000 feet. It is found throughout all the hill-ranges of Northern Burma to the Shan States.

"In Assam I found this beautiful bird breeding between 1,500 and 3,000 feet in some numbers, whilst old birds bred practically in the plains and I took one nest at the quite exceptional height of 6,000 feet in the Khasia Hills." In Assam he found it "a bird of well-wooded open country" and sometimes breeding on the outskirts of forest and in North Cachar most nests were found "attached to pendant branches of the creepers" of Oak trees in "park-like grass country. At Maymyo Harington found it breeding in numbers in compounds, especially on or near trees where Drongo's had nests, this was such a common occurrence that if any of these Orioles were in a compound where Drongos were nesting he knew their nest would be somewhere in the vicinity of the latter. The nest is the usual cradle-like structure suspended from the horizontal fork of a tree or from creepers and, according to Stuart Baker, "constructed entirely of grass-blades or soft tow-like fibre from the bark of trees looking just like jute. The lining was invariably of fine grass stems.....

"Roughly they measured from 5½ to 6½ inches in diameter by rather more than half that in depth, the cavity being about 3½ inches across by 2 to 3½ inches deep. Very often the lips of the nest were a little bent inwards giving greater security to the contents in a wind-storm. They were built at any height from 10 to 40 feet from the ground, but usually under 25 feet."

They lay two or three eggs, a beautiful pink colour when fresh with black or, sometimes, light chestnut spots "surrounded by a halo as if they had run." *(Stuart Baker).* They average in size, 27·9 × 20·7 mm.

I can find nothing about this bird in captivity.

2. THE INDIAN BLACK-HEADED ORIOLE.

Oriolus xanthornus xanthornus (Linn.)

Field identification :—A bright golden-yellow bird with head, most of wings and centre of tail, black. Found commonly on trees in open country and gardens less so in open forests. The notes are mostly melodious.

Description :—Length about 9½ inches ; wing 5·4 inches and tail 3·4 inches.

Male :—Head, upper breast, nearly all the wing, a broad band on the centre and most of the shafts of the tail-feathers black ; the rest of the plumage rich golden-yellow.

Bill deep pink ; legs plumbeous and iris crimson.

Female :—Similar to but generally not as brightly coloured as the male.

The *young bird* has the forehead yellow, rest of head brownish-black streaked with yellow ; throat and upper breast yellowish-white with blackish streaks ; otherwise like the adult only much duller in tint and the breast is faintly streaked with brown. In older birds the yellow streaks on the head disappear and the streaks on the throat and upper breast become much blacker.

Nestling :—The yellow on the back is very boldly streaked and the breast has brown streaks ; the tail is bright golden-yellow.

Bill rosy-pink, pale plumbeous at the tip ; iris light brown ; legs pale plumbeous ; claws pink.

Distribution. In our area :—It is a resident bird in the Duars and the Terai but does not appear to ascend the hills at all, although Stevens thinks an Oriole seen by the late

E. A. Wernicke, below Bannockburn tea garden, may have been this species; it is more probable that it was the Burmese Black-naped one which is known, sometimes, to occur in our hills.

Outside our area :—Whistler and Kinnear give the distribution of this race as "Sub-Himalayan ranges from Kangra to upper Assam ; the Gangetic plain."

Habits :—This is one of the most beautiful as well as one of the commonest birds in the gardens of the plains. Its bright yellow and black colour as well as its melodious notes bring it vividly to the attention of all who are fond of birds. It is almost wholly arboreal but it is, sometimes, seen on the ground catching insects.

It is a bird of open country with mango topes or woods scattered about but, although Stuart Baker says it is not a bird of the forests, we have found it quite common in those of the Duars, but this is certainly not its usual habitat. These beautiful birds are full of the *joie de vivre* chasing each other from tree to tree and calling with their melodious notes. They are usually seen in pairs but family parties are also come across as also single birds. With regard to the latter Cunningham remarks : "The solitary birds occasionally seem to be soured by the want of companionship, and travel round hustling other birds and knocking them off their perches out of gratuitous ill-temper—conduct of which paired birds are never guilty". They have various notes, pairs may be often heard calling to each other *yū-hū-a-yu*, the reply being *tū-hū-ēē* or only *te-hēē*. Besides these melodious notes they also, sometimes, utter harsh cawing notes and the young utter a churring cry somewhat like that of young starlings. As described in our book "*Birds of an Indian Garden*" during the Rains this bird often makes a whistling call like *whitter* ; if one mimics this call birds will often reply for a considerable time.

The food is chiefly fruit but insects are also eaten to some extent. With regard to this we quote from the above-mentioned work :—"The late C. W. Mason examined the

stomachs of twenty-three birds at Pusa and found that seventeen of these had fed on wild fig fruits and five of these contained nothing else ; the eighteen which had fed on insects contained 95 insects of which four were classed as beneficial, 73 as injurious and 18 as neutral. Five birds had eaten insects only. In the Central Provinces Mr. E. A. D.' Abreu found a Pyralid caterpillar and *Ficus* fruit in the stomach of one bird examined on 24th January 1914. At Pusa also we have watched this bird feeding on masses of a mealy-bug clustered on the stem of a wild vine growing on a *sissu* tree. So far as agriculture is concerned, therefore, this bird may be considered beneficial. It has not been known to attack cultivated fruits."

They breed from March to August. Stuart Baker has taken fresh eggs in the latter mouth. O'Donel says that they breed from March to May in the Duars.

The nest is the usual rather deep cup-like structure suspended, usually, between the fork of two horizontal twigs but sometimes, though seldom, in upright forks. The nests are suspended from the extreme ends of the branches and may be anything from 6 feet to even 30 feet from the ground. They are usually found on mango-trees, *all* those we took in Bihar were so situated but tamarind trees are also said to be favourites. The nest is composed of tow-like material or strips of bark, etc., often with bits of lichen and flakes of bark adorning the outside. We have seen nests almost wholly composed of strips of bark, others again may have only the tow-like material used in their construction. Cobwebs are also used in many cases, especially to strengthen where the nest is bound to the twigs, it is also sometimes used in the construction of the nest : the inside is lined with fine grass or fine tamarisk twigs.

The usual number of eggs is three but two and four are sometimes laid and we have found a single highly incubated egg in a nest, but something might have happened to the rest of the clutch. In colour they vary from pinkish-white to deep salmon-pink sparsely spotted and streaked with dark brown and inky-purple. They average in size 28 × 19·4 mm.

Finn does not consider them to do very well in captivity. In the Alipur Zoo they have not lived longer than four years. Those kept in that Zoo were fed on "Satoo, insects, fruits &c; they especially like peepul fruits, and have also been observed to eat with avidity the fruits of *Ficus comosa* and sweet *Inga*." We hope that great Indian aviculturist and bird lover Dr. Satya Churn Law will give us his experience of keeping the various species of Oriolas in captivity and also any remarks on their breeding in his large aviaries.

3. THE INDIAN MAROON ORIOLE.

Oriolus trailü trailü (Vigors.)

Field identification—A maroon-red coloured bird with black head, neck and wings; the female is duller and has the lower plumage dull white boldly streaked with brown. It is a forest loving bird usually seen singly or in pairs and has a fine mellow note.

Description.—Length about 11 inches, wing about 6 and tail about 4½ inches.

Male.—Head and neck glossy black; wings dull black; t ail chestnut-maroon rest of plumage glistening maroon-red.

Bill pale bluish-plumbeous paler at tip: iris buff-yellow to "orange-yellow" (*Baker*) legs plumbeous.

Female.—There has been a good deal of discussion as to the adult plumage of the female. In the old Fauna and earlier works it was given as similar to the male but Primrose, who sexed many birds, found *all* the maroon and black birds to be adult males, those collected by Stevens and ourselves also confirm this but *sometimes* the female *does* assume the full plumage of the male as Delacour and Jabouille in their *Les Oiseaux de l' Indochine Française* write:—"Les femelles different des mâles, *mais nous en avons collecté une à Xiengkhouang dont les parties inférieures étaient rouge foncé commes chez les mâles adultes*" (the italics are ours).

The adult female differs from the adult male in having the mantle and the central and the outer webs of the lateral tail feathers maroon-brown; the lower plumage greyish-white, darkest on the breast and whitest on the abdomen and boldly streaked with blackish-brown.

The young male is like the female but more richly coloured. One fine specimen has the whole plumage like the adult except that it has not assumed the full glistening maroon-red of the lower plumage, that being white *very* boldly striated with maroon-red.

Young females appear to show very little maroon tinge on the mantle and have the forehead and whole of the lower plumage from the chin downwards dull white streaked with blackish-brown.

Nestling.—" Above brown, rather darker on the crown, the feathers of the mantle and of the wing-coverts edged with rufous; rump brown, streaked darker and suffused with chestnut; tail-feathers maroon-brown, the inner webs of all the lateral feathers chestnut-pink; chin and throat brownish-white, streaked with dark brown; breast almost entirely brown; abdomen and flanks white with brown centres; thigh coverts dark brown; under tail-coverts pale pinkish chestnut." (*Stuart Baker.*)

Distribution. In our area:—Resident in the plains and up to about 7,500 feet in the hills. Shebbeare saw this bird up to 10,000 feet in the Rongshar Valley, Tibet in 1924.

Outside our area:—Stuart Baker gives the distribution as "throughout the Himalayas from the Sutlej Valley to Eastern Assam, Manipur, the Hilly tracts of Burma to Tenasserim, Shan States, Siam and Annam." There are several races of this Oriole in Indo-China, Delacour believes that our race only occurs there during the winter.

Habits:—This Oriole is essentially a forest bird, keeping, principally, to the tops of trees. It is more wary than the other Orioles though we have not found it much

shyer, if any, than the Burmese Black-naped one. Its flight is less undulating than that of the other species and the note is a melodious whistle. It is generally seen singly or in pairs and feeds largely on the ripe fruit of various wild fig trees but also eats caterpillars, those dissected by Jerdon having only fed on these.

The breeding season lasts through April and May but Stuart Baker has found a nest as late as the 24th June. In our area nests have been found in April in the hills but we have no information as to when they breed in the plains. We give, in full, the notes on nests found in our area from Humes' *Nests and Eggs of Indian Birds 2nd ed., Vol. 1 p. 362*:—"From Sikkim Mr. Gammie writes:—"I took a nest of this Oriole on the 24th April, at an elevation of about 2,500 feet. It was suspended, within ten feet of the ground, from an outer fork of a branch of a small leafy tree, which grew in a patch of low dense jungle. It is a neat cup, composed of fibrous bark and strips of the outer part of dry grass-stems, intermixed with skeletonized leaves and green moss, and lined with fine grass. Besides being firmly bound by the rim of the cup to the horizontal forking branches by fibrous barks, several strings extended from one branch to the other, both under and in front of the nest, while other strings from the body of the nest were fastened to an upright twig that rose immediately behind the fork, thus most securely retaining it in its position.

"Externally the nest measured 5 inches wide by 2·75 in height, internally 3·25 wide by 2 deep. It contained three fresh eggs.

"The female came quite close, making loud complaints against the robbing of her nest." Gammie took another nest on the 20th of the same month at the same elevation and very similar to it in construction.

Hume writes :—"A nest sent me by Mr. Mandelli was found on the 3rd April at Namtchu, and contained three fresh eggs. It is precisely similar to the one above described, except that the living roots are mingled with the

fine grass and that instead of being suspended in a fork, it was partly wedged into and partly rested on a fork.

Stuart Baker in his fine work *Nidification of Birds of the Indian Empire Vol. II p. 505* say :—The Maroon Oriole breeds, I believe, between 2,000 and 6,000 feet throughout its range, either in forest or in densely wooded open grass country.

"Most often, I think, the nest is built high up in some tree just on the edge of tall tree forest where it is evergreen and very dense or in rather lighter deciduous forest. One nest taken in the Khasia Hills was fully 50 feet from the ground and I have seen others 30 or 40 feet up, while, on the other hand, I have taken some as low down as 15 feet in small saplings".

With regard to the eggs he writes :—"The eggs are quite typical Orioles's, the ground sometimes pinkish-white, but generally a warm pink, while the markings are rather bold and handsome in most eggs. In a clutch of three the markings are of deep chocolate-red, in one egg being most dense in a ring round the larger and, which is suffused with deep rosy pink. The number laid is nearly always three."

He gives the average of twenty-four eggs as 29·4 × 20·6 mm. and remarks that "We twice snared the male on the nest, so it must take a share in incubation, but, so far as I know, it takes no part in building-operations."

This Oriole lived in captivity about eighteen months in the Alipur Zoo. Mr. Sanyal found it "more carnivorous in its appetite than other species of Orioles."

The following most interesting notes on Orioles have been sent to me by Mrs. Milburne from Assam.

Burmese Black-Naped Oriole.

Seen occasionally in heavy jungle, towards the end of the cold weather. This year, from March 14th—24th when

we left for camp, one circled round the bungalow daily, but at a distance, from *sau* to *sau* tree in the tea. It moved from point to point with such regularity that one could almost tell the time by its position. Starting at dawn, it sang almost incessantly while perching, pausing for a few minutes from time to time to pick caterpillars off the trees and eat them, or fly to its next point. Between 9 A.M. and 4 P.M. the singing was less constantly repeated, then more frequently till dusk, when it ceased. I heard a bird of the same species on a neighbouring garden. Unfortunately, both left while we were away.

The songs, in some cases, reminiscent of the Black-headed Oriole, were more loud and varied and lacked the mellow quality. They could be heard clearly at more than ¼ mile distance.

1. This was the most characteristic song, quite unlike the others. A variation was sometimes used. Each took about one second, sung very fast and followed by two or three of silence. The tone was that of bag-pipes :—



2. A series of clear, easily imitated whistles, the same tune but varying slightly in key in different bouts of song :—



3. The same song as the Black-headed Oriole but more loud and strident and omitting the first, soft note.

4. Squawking cries, rather mocking in tone, possibly in imitation of Large Cuckoo-Shrikes which were very common at the time.

5. A quieter song on one, undefined note :—



The songs were mixed indiscriminately, each being, as a rule, repeated several times, Nos. 1 and 4 predominating.

The bird was more often heard than seen. It kept well hidden in the *sau* trees which had then many yellow-green faded leaves on them. The back was more green than as described by Oates, a dark yellow-green against which the clear yellow markings showed distinctly. In other respects, as far as one could ascertain from a "field identification", it conformed with his description. A much more slender, elegant bird than the Black-headed Oriole, with direct, rapid flight, keeping mostly to the tops of trees.

Indian Black-Headed Oriole.

These occasionally pass through the garden, singly or in pairs, sometimes remaining a few days, *e.g.*, June 15th-18th 1933, when a pair flew between certain *sau* trees daily between 5 and 8 A.M. and remained in the locality for a fortnight. I think attracted by looper caterpillars. When camping up the Gabru, March 24th—April 6th, where the grass jungle is interspersed with clumps of trees, I noticed that each clump had an Oriole of this species in song :—



The tone was rich and mellow, the first note only audible at close quarters. Also a variety of soft but rather squawking cries and others reminiscent of their name, "Oriole". They sang most in the morning but also throughout the day.

A pair of Black-headed Orioles have been with us for several weeks. I have only noticed the cock singing, chiefly in the morning and evening but sometimes in the middle of the day as well, if, for instance, it stops raining which is seldom! I have noted the following three songs.



One and two are often used together but with a pause of two or three seconds between. Each tune usually repeated a few times, three is the tune most commonly used by this bird.

Maroon Oriole.

Not common but seen in January and February in two places, pecking at the flowers of *Kapoc* trees in dense and open jungle. I noticed no particularly distinctive song. A young cock bird, the head still brown, had a cry difficult to describe, a soft, sucking *zaw, zaw, zaw,* each about two seconds apart. (Approximately imitated by sucking back of front teeth with tongue).

I was unable to discover whether any of the above songs was peculiar to any special time or emotion.

BEARS AND THEIR SHIKAR.

By

Colonel H. S. Wood, I.M.S.

(Continued from Page 14.)

With a Halftone Plate and Line Block.

3. THE MALAYAN BEAR.

This Bear is fairly common in Assam, especially in the Nowgong district. It is a small Bear with very short fur and the semi-lune on the chest is yellowish in colour. I think it is more or less an arboreal animal and, it is said, the female deposits her cubs in the hollow of a tree. This, I think, is correct as in the nature of the ground they inhabit there are no caves. I have never come across one but a young one, which a Forest officer had, was one of the jolliest and most docile pets I have ever seen, it never showed any temper when playing with one. I do not know whether this Bear is found in other parts of India and a detailed account of its habits and shikar would be interesting as I believe there is little known about it. From accounts of natives its food is chiefly honey and larvæ of bees, which its finds on trees. The shortness of its claws is against it being an animal that digs for its food. I am also inclined to think that its habits are not as nocturnal as the other Bears. There is very little known about this Bear in a wild state and we hope that any of our members who have come across this animal in Assam or in the Chittagong Hill Tracts will tell us something about it.

[The Malayan Bear (*Helarctos malayanus*, Raffles) is the sole representative of its genus. Pocock (*Journal of the Bombay Natural History Society Vol. XXXVI. No. 1*) gives its distribution as :—"Assam, Burma, Indo-China, thence southwards through the Malay Peninsula to Sumatra, Java and Borneo." It is also found in the Hill Tracts of Chittagong and some people believe it occurs in our hills, but there appears to be no reliable evidence as to this. Elwes writing



MALAYAN BEAR *(Helarctos malayanus)*.

BY COURTESY OF THE AUTHOR AND OF THE JOURNAL OF THE B. N. H. SOCIETY.

on "Notes of some Mammals in Sikkim" *Journal of the Bombay Natural History Society Vol. XXIII*) says :—"There seems little doubt that the Malayan bear which has not, so far as I know, been recorded in the Dooars or Terai occurs in Sikkim." The late Mr. W. P. Masson in 1900 communicated a "Note on four Mammals from the neighbourhood of Darjeeling" to the *Journal of the Asiatic Society of Bengal Vol. LXIX. Part II.* He writes with regard to this Bear "With regard to this animal in the year 1883 I wrote to "*The Field*" under the nom-de-plume "Pultency" a note entitled "Bear Shooting in Darjeeling" :—"Jerdon, in his 'Mammalia of India'—and I see Mr. Sterndale follows him—has only one species of black bear found in the Himalayas *(Ursus tibetanus)*. Now I know two distinct kinds. *U. tibetanus* and a smaller species. *U. tibetanus* seldom climbs trees, but the smaller species always does. It is entirely a very glossy black, with the exception of a very narrow white mark on the chest, sending up a branch on each side in front of the shoulder ; the nose is buff-coloured or white. I have shot many of both species, and have now in my possession skins of both. Most of the villagers about the hills could have told Mr. Sterndale that there were two kinds of bears, one called the 'bhooe bhaloo', or ground bear, and another 'rook bhaloo', or tree bear. I have always found the bhooe bhaloo or ground bear (*Ursus tibetanus*) very much more numerous than the rook bhaloo or tree bear". In the same note I mentioned that on the 23rd of October, 1883, a friend, my brother and myself went to Birch Hill Park about 9. P.M. one moonlight night, and we saw three bears in a small oak eating the acorns ; and on the following night counted no less than five in a single tree, all of them were rook bhaloos. These numbers are unusual, as a rule not more than a couple of bears are seen in one tree. I may remark that I have since found that *U. tibetanus* in the Darjeeling District does climb trees, as I have shot them in oaks when the acorns are ripe in October. Also that the smaller species, *U. malayanus*, principally affects oaks and chestnuts, in which they form rude nests by breaking off the smaller branches and piling them into a heap amongst

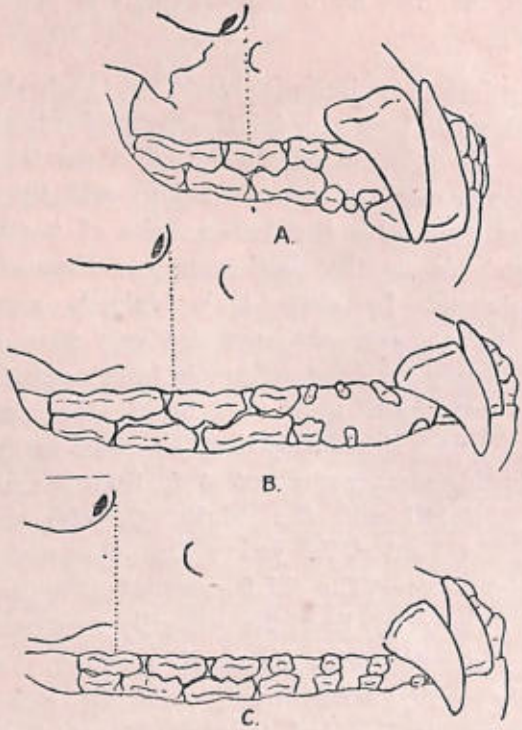
the larger branches ; and that the examples of *U. malayanus* I have shot were of the normal form described by Mr. Blanford in which the crescentic white patch on the chest does not have the apex prolonged into a white streak on the abdomen. The claws are short. The hillmen dread the rook bhaloo very much more than the larger species, and they all agree that if disturbed it attacks at once." We remain quite unconvinced both by Elwes' and Masson's statements as also by others we have heard during the last twelve years. In the very first number of our Journal, dated June 1926, Shaw asked for evidence as to there being two kinds of black bear in our District but *none* has been forthcoming. The late Mr. Wright wrote to us that he was shown, on two occasions, once above Dow Hill and once above Sonada, nests made of dry twigs and leaves *said* to be built by Rookh bhalus (tree bears) but *that* is not very conclusive either. Nothing has been *produced* to uphold any of the statements which we have heard and so there the matter still remains. Col. Wood says it is fairly common in Assam, especially in the Nowgong district but Mr. Higgins writes that "During the three years I was in Nowgong.....I only came across one Malay Bear." *(Journal Bombay Natural History Society Vol. XXXV. p. 673.)*—He also writes in the same Journal about its occurrence in Manipur. "This bear is distributed throughout the hills of the State but is not common. During the seven years I was on foreign service in the State (1910-17), I paid rewards for the destruction of 1,389 bears, and speaking from memory, I should say that not more than 1 per cent. of these were of this species".

We quote Pococks' description. "The coat, when perfect, is comparatively short and sleek, although thickish and provided with underwool ; but it becomes thin and harsh as the moult approaches. It further differs from that of other bears in the presence of two whorls on the shoulders whence the hair radiates in all directions, running forwards along the nape and to a varying distance over the crown. On the sides of the neck there is, as in *Selenarctos*, a crest formed by the meeting of the downward

stream from the nape and the upward stream from the throat. There is also in the centre of the breast-patch a parting whence the hairs radiate. This is not present in *Selenarctos*.

The colour is typically jet black, but the dead coat may be tinged with brown, or faintly speckled with buff. The paws are often brown marginally. The muzzle is always greyish tan or mealy, above and below, and the tint blends round the eyes with the brown hairs of the head. The breast-patch is usually buff, creamy or dirty white, more rarely ochreous. In shape it is typically more or less cresentic, but one arm may be much bigger than the other; not uncommonly the arms coalesce in front, enclosing a black area, the pale hairs may even invade the central streak making the patch shield-shaped. The claws are black. The adult (male) measures about 4 ft. from the snout to the root of the tail and the adult (female) about 3½ ft. According to Cantor the young has the coat speckled." Pocock also says :—"The chief external differences (between this and *Selenarctos*) lie in the generally shorter and broader head of *Helarctos*, with its small, rounded, broad-based, defectively cartilaginous ear, its modified rhinarium and more protrusible lips and tongue. The feet are similar, but the fore limbs are more bowed, with the paws turned inwards in adaptation to a more arboreal habitat. The coat is shorter, sleeker, never so shaggy, with some differences in the hair-slope on the neck, pointed out below (above).

In the skull the chief differences lie in the abbreviation of the jaws, the relatively large canine and incisor teeth, expanding the muzzle in front and shortening the series of cheek teeth to the extent sometimes of practically crowding out the small anterior premolars and bringing the canines almost in contact with the first larger premolar above and below. This is accompanied by an extraordinary development of the bony areas of the cranium to which the neck and jaw muscles are attached, the exceptionally wide zygomata and mastoids and the high sagittal crest, the back of the skull being less depressed than in *Selenarctos*, but the brow may be inflated or flat and the top of the



A. Jaws of the Malayan Bear *(Helarctos malayanus)* showing the short muzzle and the enormous canines with consequent crowding of the premolars.

B. The same of the Himalayan Black Bear *(Selenarctos thibetanus)* with longer muzzle and nearly complete dentition.

C. The same of the Sloth Bear *(Melursus ursinus)* with still longer muzzle and complete, more primitive dentition. (The dotted line is a tangent from the front edge of the orbit to the upper molar teeth).

BY COURTESY OF THE AUTHOR AND OF THE JOURNAL OF THE B N. H SOCIETY

muzzle steeply or gently sloped as in that genus". For the benefit of readers we mention that the rhinarium is the well developed area of naked skin round the nostrils.

In the whole of the 36 volumes of the Bombay Natural History Society I can only find two short notes on this Bear neither of which add much knowledge to the little we know of the habit of this animal. In the first of these notes Major Phythian-Adams tells of one he shot about 20 miles North of Bhamo in Burma. He writes :—"My shikar diary unfortunately gives no exact measurements but states that he was about 4′ 6″ long ; head very broad ; short thick glossy fur with a fine orange V. He was full of honey which ran out of his mouth on the way back to the bungalow ; the Burmans had no hesitation in eating it." We have already quoted most of the second one by Mr. Higgins. He, too, did not take the measurements but says that she was certainly less than 4½ feet long. Further on he writes :—"Some Mikirs brought in what they claimed to be a 'black tiger', for the reward. This proved to be a full-grown Malay Bear. But my classification of the animal as a bear was received with polite derision by the Mikirs, who said that they were perfectly familiar with the bear and that this was certainly not one. Their familiarity with the bear is undoubted as there are few Mikir villages which do not contain at least one unfortunate who has been mauled by a bear. But their claim that it was a tiger was largely influenced by the fact that the reward for a bear was only Rs. 5, whereas the reward for a half-grown tiger was Rs. 12-8-0. They stoutly refused to be convinced, until the argument was closed by my Head Clerk, with the words, 'The Sahib says it is a bear, so it is a bear".

All that Major Evans in "*Big Game Shooting in Upper Burma*" has to say is "The Malay bear is not often met with. It seems to keep to secluded spots and heavy jungle, and is probably more often found in the dense forests of Tenasserim and Lower Burma than elsewhere. Its habits are identical with those of the common black bear, though Burmans assert that it is more ferocious than the larger

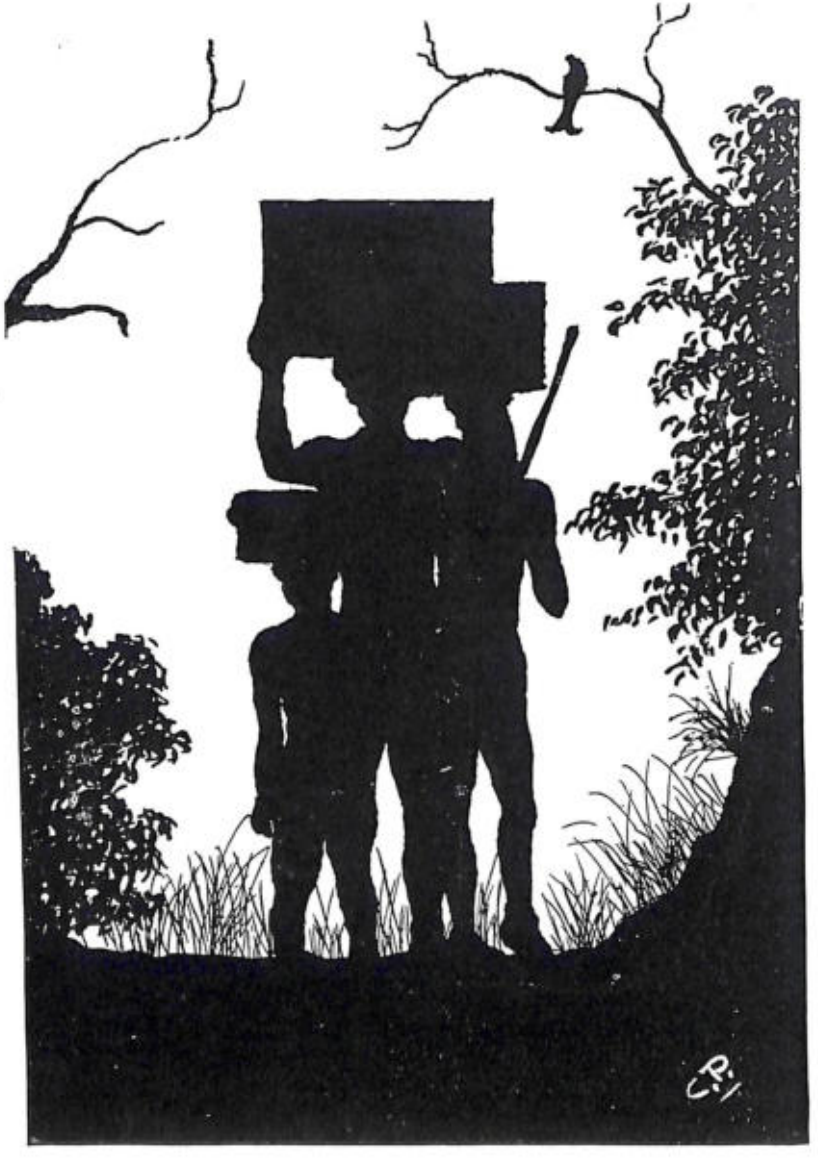
species, and will frequently attack on sight. This reputation probably arises from the fact that, owing to the thick jungle in which he lives, he is very likely to be suddenly surprised at close quarters by unwary bamboo-cutters, under circumstances in which the Himalayan black bear would be equally likely to attack, as many a native of India can testify.

In size the Malay bear is the smallest of the bear tribe, averaging about four feet in length, and weighing from sixty to a hundred pounds. He differs from the common black bear in having a very short, thick coat, and the horse-shoe on the chest orange coloured instead of white".

Blanford wrote :—But little known except in captivity. This bear is a purely forest animal and an admirable climber. It is essentially frugivorous, but like other bears occasionally kills and eats animals and birds. It is said to be very fond of honey, and it probably devours insects and their larvæ. Occasionally it is said to attack man. The instances of such attacks mentioned by Dr. Mason in his work on Burma may, however, have been due to *U. torquatus (S. tibetanus)* and not to the present species.

In confinement *U. malayanus* soon becomes very tame if captured young, and from its activity and antics is very amusing."

Rowland Ward gives the record measurements. Length 5 ft. 6 inches, from Indo-China, probably measured along the curves. The largest Indian one is given as, length 4 ft. 8 inches ; height at shoulder 2 ft. from Assam [*Editor.*]



THE COOLIES CARRYING THEIR LOADS SILHOUETTED
AGAINST THE EARLY DAWN.

An attempt at Angling.

BY

C. PRIMROSE.

(With Illustrations.)

(Continued from page 17).

To describe the scenery along the route is beyond my powers and the beauty of the rocky bluffs and precipices forming the South side of the valley in which the river flows have to be seen to be appreciated. The spurs running up to the Mysore Plateaux on the opposite side of the valley are more gentle in contour and this contrast adds greatly to the charm of the scenery of the valley which, if only for the views it affords, is well worth a visit. From the saddle marked A (5,200 feet) the rough path winds down a narrow gorge whose sides are, in parts, of canyon-like steepness, to the point B (2,000 feet) when the gorge opens out into the main valley. In a direct line it is only two miles between those two points though it is over five by the path. The fauna and flora of this lower elevation are entirely different from what one observed at point A and it is very interesting to note how conservative such are in their range of altitude. Of the Mammalia, during the two and a half hours which it takes to drop 3,200 feet, one sees little but the Birds and Plants are easily observable the former drawing attention to their presence by their notes. Each Zone, judging by ear, has its soloist with an accompanying chorus, and the Zones, which are quite distinct, I noted as follows:—5,200 to 4,800 feet the soloists were the Malabar Whistling Thrush and the Nilgiri Quaker Babbler, chorus *fortissimo* the Nilgiri Black Bulbul, the Red-Whiskered Bulbul and the ubiquitous King-Crow and Green Barbet; 4,800 to 3,000 feet the soloists were the Spotted Babbler and Chloropsis and the chorus mainly the Blue-winged Paroquet and Green Barbet with sundry nervous and subdued helpers; 3,000 to 2,000 feet, soloist the Magpie Robin, chorus the Dove family, White bellied and Common Drongo with the Coppersmith vigorously assisting; the

The following diagram will help to give my readers an idea of the rough walk of 15 miles that lay before us.

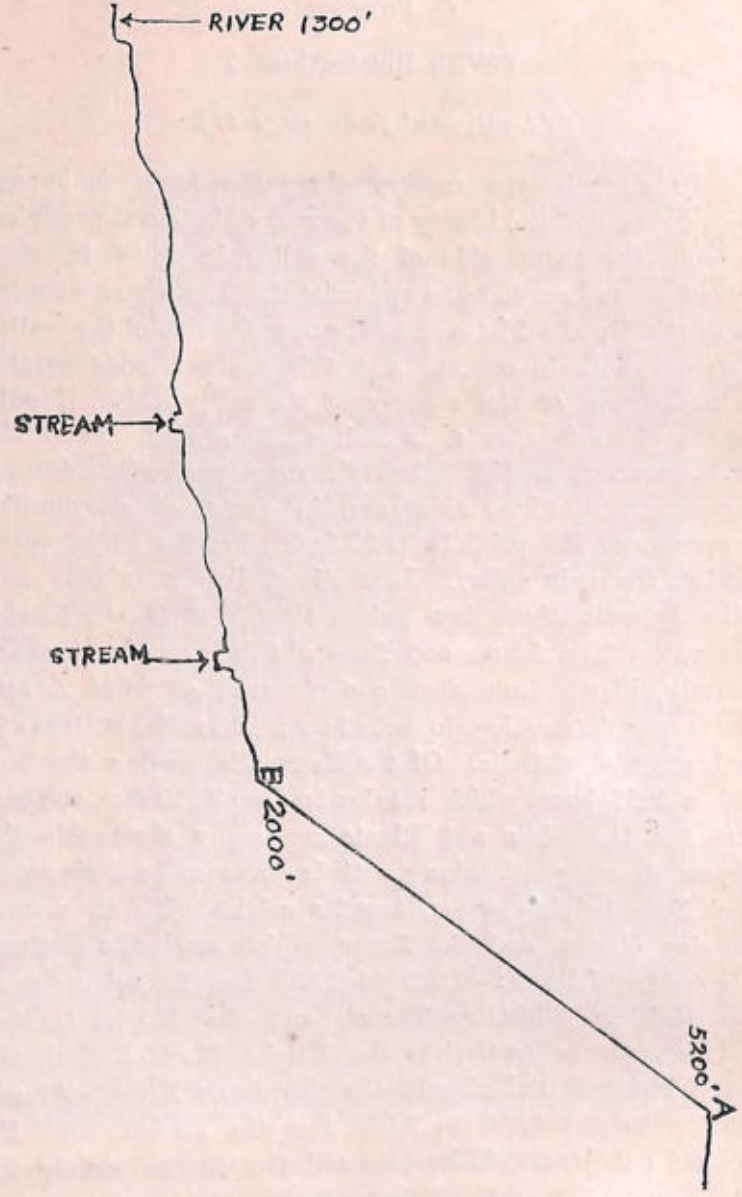


DIAGRAM OF THE MARCH.

Woodpeckers supply what, I suppose. they intend to be the drums but which sounds much more like machine-gun fire, but they have still to learn when to come in, at present they waste their energy in doing their bit in a dead silence. From the second Zone downwards the Great Indian Hornbill, who I am sure, has unanimously been ejected from either solo or chorus, occasionally upsets both by drowning them with his raucous tiger-like bass. The Mammals are represented by that fine squirrel *Ratufa sp.* and lower by his diminutive cousin the Palm Squirrel. Anyone who fails to be charmed by this music is to be pitied as it is such matters that constitute the charm of the wilds, in any part of the World, and enhance the pleasure of a trip, whether the ultimate end be fishing or any other sport. As regards the flora the most marked feature is that in the main valley with an average altitude of about 1,500 feet, it is that of the typical plains of India, every plant from the Babul to the spear grass being heavily armed with spines of a very affective and painful character; nor is this armament confined to the plants as every ant, with which every valley is well supplied, stings and the Anopheline mosquito together with the Cobra *Echis carinata* and Russell's Viper, which all occur there, may perhaps be excused if they pride themselves on their armament. It is difficult to understand the reason for this race for armaments but I am inclined to believe that these trying insects, reptiles and thorns are the barbed wire entanglements erected, by Nature, round what she meant to be a Sanctuary for some of her most beautiful children such as the Spotted Deer and the Peafowl. Alas! thanks to a congenital immunity from malaria, the possession of a muzzle loader and the knowledge that the demand for venison exceeds the supply, Nature's barbed wire has been penetrated by that arch enemy of all game, the Indian poacher, the result is that this valley which teemed with game twenty years ago is now conspicuous by its absence. The Forest Department does its best to prevent poaching but the general conditions are so adverse that these efforts can hardly be expected to come to much so the poacher carries on his nefarious work

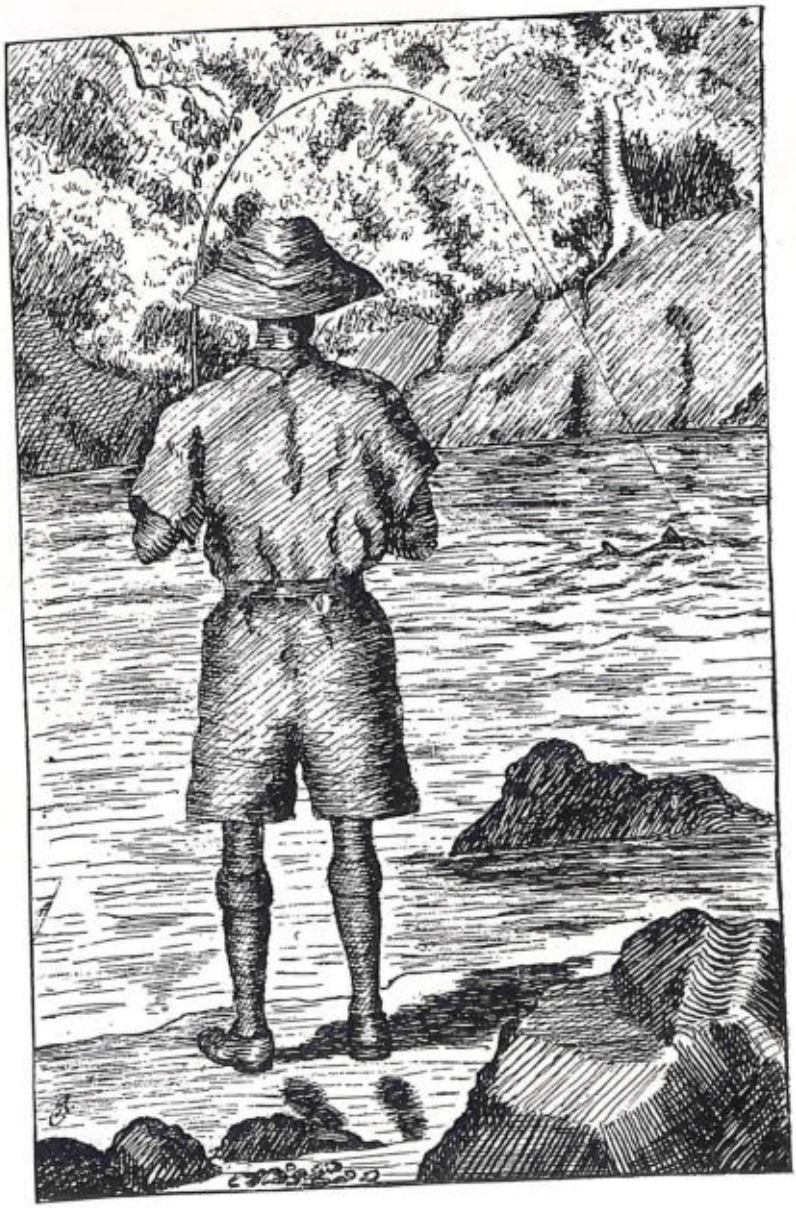
undisturbed. The valley being highly malarious is considered a penal settlement by subordinates of the Department and as it is so easy to amass a certain amount of riches by winking at the misdeeds of the poachers, they just "say naught" even though it is at the expense of the game which they are supposed to protect. So if one wishes to keep up one's interest in the wild life seen on the march one must extend it beyond such animals as are considered "game." One who resides on the Nilgiris will find much of interest in the birds and beasts, flowers and plants which are confined to these low elevations that one's interest never flags and one forgets the trying heat and the discomfort of rough walking. A few more miles brings us to a pretty stream whose banks are lined with huge evergreen trees affording welcome shade. Here we decide to halt and have a snack while the porters prepare and eat their meal. The water in this stream is gin clear and full of small fish which fairly make the water boil in their jostling to get at some crumbs which we threw in. There are the young of *Barbus tor* and *carnaticus* and full grown *Barbus melanampyx, Rasbóra daniconius, Barilius gatensis* and *Danio neilgherriensis.* We are greatly encouraged by the conditions in the small tributary and picture the main river as a much magnified edition of it; we, therefore, start moving again as soon as possible and after one more brief halt at a similar, but smaller, stream reach the main river at 4 P.M. The sight of the muddy water in it fairly makes us weep but as I philosophically remark "I've sweated like blazes to get here and I'm jolly sure I am not returning without trying my luck" we decide to set our camp in order and start serious fishing the next day.

After a second night's rest dawn found us examining the river without being able to decide, in the uncertain light, whether there was any difference in its condition since yesterday. After an early *chota* we decided to start operations and set out accordingly. J. fishing down stream from camp and I in the opposite direction. It was heart breaking to see the lovely runs and pools which the condition of the water made not worth while trying for the fine Mahsir

which, undoubtedly, inhabited them. Owing to the discoloured state of the water we both decided to confine our efforts to fishing for *Barbus carnaticus* and later on when we met in Camp our total bag consisted of, to J. three *Barbus carnaticus*, the largest 1 lb. and to myself a single fish of the same species weighing 1¼ lbs. J. had used grasshopper and I ¾ all silver fly spoon which probably accounted for his larger bag. At 3 P.M., we start again and now the water is slightly cleaner. We reverse the process of the morning and I fish down stream. By 6 P.M., I reach camp having only caught two small carp, only just 8 ozs. J. seems in good humour and, laughingly, invites me inspect his catch. I find it consists of 7 Siluroids, 5 of which are the young of *Wallago attu* and two of a species of *Aoria* all about as ugly as possible. We pick out the largest and weigh it, it is just 1½ lbs. J. kept to grasshopper as his bait but the first hour or so yielding nothing he made himself comfortable under a shady tree. While smoking there he cast his grasshopper, more to let his cast soak than with the intention of fishing and was soon rewarded by seeing his line moving away. On striking he found he was into a small *Wallago attu* and thus encouraged he kept on at the same spot with the above mentioned result. Anyhow, thanks to him, we have edible fish for dinner, a half pound *W. attu*, fresh from the water and properly cooked is by no means worthless for the table (We have always found the young of this fish exceedingly good.—*Editor*). We how turn in for the night in much better humour than on the previous one. Next morning the water is definitely clearer though far from clear enough to make Mahsir fishing worth while. Encouraged by the improvement I suggest that we walk five miles across country up stream to a point where a tributury flows into the river and from there to fish down to camp. As J is disinclined to leave the home reaches, I set out alone and after a hot five miles walk, with the sun beating on my back, reach the junction of the two streams. There is some lovely water here and it is disgusting to see it so discoloured. I first experimented with the Blackamoor, the fly so highly spoken of for *B. carnaticus* by Thomas but

an hour's patient, and sometimes pretty, casting did not result in a single fish. I then changed over to a ¾" all silver fly spoon and just as I was beginning to think that this also was going to prove a frost, there is a vicious tug, a short scream of the reel and all goes slack again. After a few more casts in a very likely looking spot I am into a fish which gives good sport on the light Trout rod and is duly landed. This is a typical *B. carnaticus* of 1¼ lbs. and of rather a more silvery colour than normal but, apparently, this is typical of this species in this river. Bearing in mind that this fish swims in shoals I sit down and smoke so as to give the shoal time to get over their fright and in ten minutes time I try again in the same spot, the fourth cast meets with success and I am rewarded with the thrills of the screech of the reel and the graceful bend of the rod and another fish, the exact replica of the last one, is duly netted, I give the water a full quarter of an hour's rest and try again but with no result the fish having become cautious.

There being miles of fine water between here and camp I moved down stream and in the next pool manage to land a half pound fish. This is a perfect piece of water but the fish seem to be, definitely, off their feed and it being 11·45 now I decide to stop fishing and have my lunch. When fishing one does not realize how hungry one is but no sooner is the rod laid down than this becomes apparent. I have a rest now till 2-30 P.M. as I have never any real success with the rod between noon an then. I start again, using the fly spoon, and moving steadily towards camp. There is not an offer till after 4 P.M. and then I only manage to feel a fish. A few casts later, however, I do better and land a 2½ lb. fish of the same species. The sky, which was lightly clouded in the West at mid-day, now looks very threatening so I increase my pace in moving towards camp. Coming round a bend in the river, about a mile above camp, brings J. into view skilfully playing, what proved to be the fish of the trip, a 4¾ lb. *B. carnaticus*. We move down to camp and examine the bag which consists of J., three carp, 12 oz., 1¼ lbs. and 4¾ lbs. and five *W. attu*, the biggest 1½ lbs. ; myself, four



SKILLFULLY PLAYING WHAT PROVED TO BE
THE FISH OF THE TRIP.

carp the biggest 2½ lbs. We now have tea and when that is over, as it is now getting dark, we settle down to a well-earned whisky and filtered water and talk over the days doings. Here I will mention a tip about filters which may be useful to some of my readers. If a Berkfield filter candle complete with rubber ring and butterfly screw is carried and also an empty kerosine tin *that doesn't leak*, a hole made in the bottom of the tin and the candle screwed into it you will have a perfect filter. Kit can be packed into the tin during the March and the single filter candle is a nice handy size and not so bulky as the bottle type of filter.

Hoping for the best we turn in but on awaking shortly after midnight the river seemed to sound much louder than it had a few hours before. This was confirmed when tea was brought in at dawn and as the river was "up and brimming" and brick red in colour we sorrowfully decided to return to the hills, sincerely hoping that we would be able to get to it some time in the future when its condition rendered Mahsir fishing possible. That, at its best, it will prove to be a first class river for both Mahsir and *B. carnaticus* I feel sure, but as both J. and I lead "a gentleman's life" we have not, as yet, been able to prove this. *Inshallah* we will yet do so and then, being anglers, we wont be believed ! I suppose if I tell my non-angling readers that, in this boring account of an unsuccessful fishing trip, I have not exaggerated by as much as an ounce I will still be duffed a liar. So deep-rooted is this idea about anglers that the story in Punch may be taken as showing the typical outlook of the layman towards them. A non-angler gazing at a huge fish on the slab in a fishmongers shop says to himself" H-m'! the man that caught that was a liar". If I could catch some of the bigger Mahsir that inhabit this river I wouldn't care how many men called me a liar. It annoys me to think that my chances of doing so are very poor entirely owing to leading, what other's call, a "gentleman's life."

The Dragonfly Fauna of the Darjeeling and Jalpaiguri Districts and Sikkim.

By

F. C. FRASER, Lt. Col. I.M.S., F.R.E.S.

PART III.

(Continued from page 31.)

Suborder ANISOPTERA.

Corduliinae.

1. The discoidal field in forewings beginning with and continued for some distance as a single row of cells; anal loop narrow, only 2 cells wide ... *Idionyx stevensi.*

   (A moderately large metallic bluish green species marked with yellow; the superior anal appendages shorter than the inferior; the bases of wings deeply tinted with yellow)

   The discoidal field of forewings beginning with 2 or more rows of cells and continued as such; anal loop broad and short, at least 3 cells wide ... (Genus *Macromia*) ... 2.

2. Costal nervure and antenodal nervures yellow; the sides of thorax yellow marked on the posterior suture by an oblique narrow dark metallic bluish stripe ... *Macromia pallida.*

   (The only *Macromia* in which the pale yellow markings are more extensive than the dark metallic ones)

   Costal nervure and the antenodal nervures black; the sides of thorax dark metallic bluish green marked by a narrow oblique yellow stripe ... 3.

3. A yellow stripe on the dorsum of the thorax present ... *Macromia miniata.*

   (A moderately sized dragonfly with the dorsum of segment 10 without a spine)

The yellow stripe on dorsum of thorax absent
... *Macromia moorei.*

(A very large species with the dorsum of segment 10 bearing a prominent spine)

Libellulinae.

1. The costal border of wing between the node and base of wing sinuously curved ... *Palpopleura sexmaculata.*

(A small compact species with short broad abdomen; the wings marked with black and golden yellow; the abdomen of the male, in adults, blue pruinosed)

The costal border of wing between its base and node quite straight or but slightly convex ... 2.

2. The Bridge of wings traversed by more than one nervure; usually more than one cubital nervure present in the hindwings ... 3.

The Bridge of wings traversed by only a single nervure; only 1 cubital nervure present in the hindwings ... 6.

3. The eyes broadly confluent as seen from above
... *Agrionoptera insignis dorothea.*

The eyes meeting at a point only as seen from above ... 4.

The discoidal cell of forewing traversed by a nervure; the nervure *Cuii* arising directly from the posterior angle of the discoidal cell in the hindwing; segment 8 of the female dilated laterally; abdomen broad and stout ... *Lyriothemis bivittata.*

(A robust species with bright crimson abdomen and with the thorax bright citron yellow)

The discoidal cell of forewing untraversed; the nervure *Cuii* arising from the distal side of the discoidal cell of hindwing; segment 8 not dilated laterally in the female; abdomen slim and cylindrical ...
(Genus *Amphithemis*) ... 5.

5. The abdomen short, red; the superior and inferior anal appendages of about the same length ... *Amphithemis curvistyla.*

The abdomen long and slim, black, the two basal segments pulverulent white; anal appendages of about the same length ... *Amphithemis nigricolor.*

The abdomen long and slim, black, the two basal segments pulverulent white; the superior anal appendages much longer than the inferior ... *Amphithemis vacillans.*

6. The outermost antenodal nervure of forewings complete ... 7.

Only the anterior half of the outermost antenodal nervure of forewing present ... ... 15.

7. The posterior lobe of prothorax very large and fringed with long hairs ... ... 8.

The posterior lobe of prothorax very small and inconspicuous ... *Urothemis signata signata.*

(A robust species with bright crimson abdomen and a basal marking to the hindwings; abdomen rather short and broad.)

8. The abdomen short, the basal half greatly dilated, the apical or terminal half greatly contracted and cylindrical ... *Acisoma panorpoides.*

(A small blue species marbled with black)

The abdomen variable in shape and size 9.

9. Rather small species with the hindwing only 30 mm. in length; only 7 antenodal nervures present; the frons and thorax dull metallic ... *Brachydiplax chalybea.*

(Wings tinted with yellow near the base; abdomen thinly pruinosed with bluish white)

Larger species with the hindwing 50 mm. or more in length; the frons and thorax metallic blue or green ... *Zygonyx iris davina.*

(Abdomen black with a large yellow dorsal marking on segment seven)

Larger species with the frons and thorax non-metallic ... (Genus *Orthetrum*) ... 10.

10. The abdomen of male broad, tapering to a point, violaceous red ... *Orthetrum pruinosum.*

The abdomen of male blue from pruinescence ... 11.

The abdomen of male black marked with yellow, the basal segments very broad, the middle ones cylindrical and narrow, the terminal ones markedly dilated and flattened from side to side ... *Orthetrum sabina.*

11. The nervure *Cuii* in the hindwing arising from the outer side of discoidal cell ... *Orthetrum chrysostigma luzonicum.*

(The abdomen pruinosed blue except the basal segments which are yellow marked with black.)

The nervure *Cuii* in the hindwing arising direct from the posterior angle of the discoidal cell ... 12.

12. The abdomen short and broad, chalky white ; the yellow markings on sides of thorax partly obscured by thin pruinescence ... *Orthetrum japonicum internum.*

The abdomen a darker blue ; sides of thorax dark yellow or blackish brown or if pruinosed, then the markings entirely obscured ... 13.

13. Small species with the hindwing not more than 32 mm. in length ; no basal marking to the hindwing. ... *Orthetrum tæniolatum.*

Larger species with the hindwing more than 35 mm. in length and with a basal marking to the hindwings ... 14.

14. The abdomen long and narrow, entirely blue ; thorax brown with whitish lateral stripes ; a golden brown marking at extreme base of hindwing *Orthetrum glaucum.*

The abdomen rather short and broad, blue except for the terminal segments which are black; thorax dark blackish brown with a median bright yellow stripe; a triangular black spot at base of hindwings
Orthetrum triangulare.

15. The apex of the anal loop open, its borders extending to the hinder border of wing ... 16.

The apex of the anal loop closed, its borders meeting before the hinder border of wings ... 17.

16. The apices of wings tipped broadly with brown; abdomen long and slim ... *Zyxomma petiolatum.*

The apices of wings clear; abdomen moderately broad and short; hindwing with a brownish medial spot and with a bright opalescent white patch on the other side ... *Tholymis tillarga.*

(Both of these latter are night flyers).

17. The posterior lobe of prothorax very large and fringed with long hairs ... *Diplacodes trivialis.*

(A small species, black marked with yellow but becoming pruinosed when fully adult; the superior anal appendages pale yellow).

The posterior lobe of prothorax very small ... 18.

18. Two or more cubital nervures in all wings ... (Genus *Neurothemis*) ... 19.

Only 1 cubital nervure in all wings ... 20.

19. Wings dark mahoghany red with clear spaces at the tips only ... *Neurothemis fulvia.*

Wings dark mahogany red as far as the pterostigma, the dark fascia running from there obliquely basalwards so that the apices and part of the posterior border are clear ... *Neurothemis fluctuans.*

Wings pale golden amber at the basal half or less ... *Neurothemis intermedia.*

Wings with the basal half deep black bordered with opalescent white on the outer side of the black portion ... *Neurothemis tullia tullia.*

20. The abdomen markedly compressed from side to side; thorax dark metallic; wings marked with blue black, or black and golden yellow ... (Genus *Rhyothemis*) ... 21.

The abdomen not compressed laterally; thorax non-metallic; wings uncoloured ... 22.

21. Wings marked with black and golden yellow ... *Rhyothemis plutonia.*

(The wings of the two sexes differently shaped, the hindwing of the female very broad and rather short; wings of male tipped with black, clear in the female; the basal marking of the male confined to the near base of wings, that of the female extending broadly to the node in the forewing and pterostigma in the hind).

Wings marked with blue metallic black with the exception of the extreme apices ... *Rhyothemis variegata.*

22. The arc situated between the 2nd and 3rd antenodal nervures ... 23.

The arc situated between the 1st and 2nd antenodal nervures ... 24.

23. The abdomen black marked with yellow or entirely pruinosed blue in the adult ... *Potamarcha obscura.*

The abdomen blood-red, basal segments violaceous from pruinescence ... *Lathrecista asiatica.*

24. The borders of the discoidal field in the forewings diverging outwards ... 25.

The borders of the discoidal field in the forewings parallel or converging strongly outwards ... 26.

25. The wings of the male crossed by a broad medial orange band; the pterostigma unicolorous, bright rust red ... *Brachythemis contaminata.*

The wings of male uncoloured; abdomen mottled with black and white (thus resembling stone colour—the insect invariably rests on rocks or cemented walls); pterostigma bicolourous, black with white at each end ... *Bradinopyga geminata.*

The wings of the male with a small basal golden yellow marking; abdomen crimson red (or yellow in the newly emerged imago); pterostigma reddish brown ... *Crocothemis servilia.*

26. The borders of the discoidal field of forewings converging strongly; a black cross-like mark beneath the posterior part of thorax; the sectors of arc not separated immediately after their origin ... (Genus *Trithemis*) ... 27.

The borders of the discoidal field in forewings parallel; no black cross-like mark beneath thorax; the sectors of arc arising from a common point but at once diverging strongly ... 28.

27. The abdomen fusiform, broad and depressed, violaceous crimson; pterostigma a reddish violet ... *Trithemis aurora.*

The abdomen slim and subcylindrical, black (unmarked in adults but marked with yellow in newly emerged imagos); legs short; pterostigma black ... *Trithemis festiva.*

(A very black species, the thorax appearing to be violaceous from a thin overlying pruinescence).

The abdomen slim and cylindrical, yellow marked with black; legs very long; pterostigma bicolorous ... *Trithemis pallidinervis.*

28. Wings dark blackish brown in the male, golden brown in the female from the base to about halfway between node and pterostigma; discoidal field begins with 5 to 8 rows of cells ... *Camacinia gigantea.*

Wings uncoloured except for small basal markings in the hindwings; discoidal field begins which 3 to 4 rows of cells ... 29.

29. A dark basal marking in the hindwings ... (Genus *Tramea*) ... 30.

Only a pale yellow spot at base of hindwing ... 31.

30. The basal marking of hindwing golden yellow enclosing a dark reddish brown spot ... *Tramea basilaris burmeisteri*.

The basal marking of hindwing blackish brown without any surrounding zone of yellow ... *Tramea limbata*.

31. The discoidal field begins with 4 rows of cells ... *Pseudotramea prateri*.

The discoidal field begins with only 3 rows of cells ... *Pantala flavescens*.

(The last five species are all characterized by the broad base of the hindwings, the narrow pointed apices of the wings and by the very narrow oblique discoidal cell in the forewings. The pterostigma of the hindwings is also markedly smaller than that of the forewings. All breed in still waters; *Pantala* and *Pseudotramea* are rarely found flying over water, the other three species rarely away from the same).

Epigomphinae.

1. The discoidal cells of both wings split up into 3 or 4 cells ... 2.

The discoidal cells of all wings entire or that of the hindwing only split up into 2 cells by a traversing nervure ... 3.

2. The margins of the 8th abdominal segment expanded laterally; superior anal appendage tapering, pointed at its apex ... *Ictinus rapax*.

(A large black and yellow species found on the borders of tanks. Breeds in still waters.)

The margins of the 8th abdominal segment not expanded laterally; superior anal appendage not tapering, its apex obtuse ... *Gomphidia williamsoni.*

(Very similar to the last in colouring but found only on the borders of rivers in which it breeds.)

3. Discoidal cell of hindwing traversed by a nervure which splits into 2 cells; coloured black marked vividly with bright apple green ... *Perissogomphus stevensi.*

Discoidal cells of all wings entire; coloured black marked with citron yellow ... 4.

4. Legs very long, the hind femora extending nearly to the end of segment 2; superior anal appendages simple, not branched ... *Merogomphus martini.*

(The hind femora have pairs of very long spines near the distal end. The 9th segment not longer than the 8th.)

Legs very short, the hind femora barely extending beyond the end of thorax; superior anal appendages with a long inner branch ... *Macrogomphus seductus.*

(The hind femora have only closely-set, very short spines. The 9th segment is nearly twice the length of segment 8 and very narrow and tapering.)

Gomphinae.

1. The discoidal cell of hind wing (and less commonly that of the forewing also) split into 2 cells by a traversing vein ... (Genus *Davidius*) ... 2.

The discoidal cells of all wings entire ... 3.

2. The dorsum of thorax black marked with a pair of diverging yellow stripes and an upper spot on the outer side of these ... *Davidius zallorensis delineatus.*

The dorsum of thorax black marked with a small median yellow triangle at its lower part ... *Davidius davidi assamensis.*

The dorsum of thorax black marked with a pair of parallel yellow stripes which are closely apposed to the median suture on dorsum of thorax
... *Davidius senchalensis.*

3. Superior anal appendages and the branches of the inferior appendage equally and widely divaricate
... *Gomphus o'doneli.*

Superior anal appendages strongly curved in a half circle and taken together shaped like a lyre; the inferior appendage triangular, black, bifid at apex
... *Stylogomphus inglisi.*

Superior anal appendages directed back in a more or less straight line, usually parallel and more or less closely apposed, the apices curled more or less downwards ... 4.

4. Superior anal appendages viewed in profile, strongly curled downwards, the apex finally turning forwards again; the inferior appendage curling strongly upwards so that its apex overlaps that of the superiors and the two appendages thus enclose a large oval foramen
... (Genus *Lamellogomphus*) ... 5.

Superior anal appendages directed straight back and only turning downwards slightly at apex; inferior appendage with its two branches directed straight back and nearly as long as the superiors, the apex of each branch with a small inner spine
... (Genus *Megalogomphus.*) ... 6,

Superior anal appendages closely apposed, directed straight back, very short, much shorter than the inferior appendage the branches of which are widely divaricate
... (Genus *Anisogomphus.*) ... 7.

(The superior appendages in all species of this genus are pale coloured and have a black process beneath.)

4. Superior anal appendages very closely apposed right from the base, the apical portion only curled downward; inferior anal appendage with its branches very closely apposed and equal in length to or much shorter than the superiors ... 9.

5. Segments 3 to 6 with an oval yellow spot on the middorsum ; 4 yellow stripes on dorsum of thorax ... *Lamellogomphus biforceps.*

Segments 3 to 6 without middorsal spots ; only 2 yellow stripes on the dorsum of thorax *Lamellogomphus risi.*

(These two species are characterized by the enormous curled anal appendages which come together like a pair of forceps, the superiors coloured yellow, the inferior black.)

6. Face and top of head entirely yellow ... *Megalogomphus flavicolor.*

Face yellow traversed by a narrow black stripe ; top of head entirely black ... *Megalogomphus smithi.*

7. The face with 3 black and 3 yellow alternating stripes ; an incomplete basal antenodal nervure present in all the wings ... *Anisogomphus bivittatus.*

The face largely black ; an incomplete basal antenodal nervure only occasionally present in one or more wings ... 8.

8. Two cubital nervures in the forewings ; only a pair of yellow stripes on the dorsum of thorax with a small spot of yellow near the upper end of each ... *Anisogomphus occipitalis.*

Only one cubital nervure in the forewings ; two pairs of yellow stripes on the dorsum of thorax, the upper end of the inner stripe strongly angulated outwards ... *Anisogomphus orites.*

9. Superior anal appendages of about the same length as the inferior appendage ; both appendages strongly curled as in *Lamellogomphus* but the apices not decurved or overlapping ; small species with the abdomen only 28 mm long ... *Paragomphus modestus.*

Superior anal appendages much longer than the inferior ; only the apices of the superiors curled down ; the branches of the inferior appendage undulated ... 9.

10. Segments 8 and 9 with broad leaf-like dilatations on each side ; anal loop absent ... *Mesogomphus lindgreni.*

(A medium sized species marked brightly with yellow, segments 3 to 6 bearing inverted pawn-like spots on the dorsum.)

Segments 8 and 9 without dilatations or very inconspicuous if present ; an anal loop present made up of 2 cells ... (Genus *Onychogomphus*) ... 11.

11. The tips of the superior anal appendages, the whole of the inferior and the whole of segment 10 black ... *Onychogomphus duaricus.*

The superior and inferior anal appendages and the greater part of segment 10 yellow ... 12.

12. Segments 3 and 4 with oval yellow dorsal spots at their middles ; the occiput black ; legs entirely black ... *Onychogomphus bistrigatus.*

Segments 3 to 6 with oval dorsal yellow spots at their middles ; occiput yellow : legs yellow with the femora of the two anterior pairs marked with black ... *Onychogomphus M-flavum.*

Anaxinae.

Thorax uniform bright green ; abdomen with paired orange or bluish spots from segment 3 to 10 ; segment 2 on the sides broadly blue ... *Anax guttatus.*

Thorax bright azure blue with restricted black markings ; no blue or orange spots on the abdomen *Anax immaculifrons.*

Aeschninae.

1. The basal space traversed by nervures ... 2.

The basal space free of nervures ... 4.

2. The ventral plate beneath segment 10 of the female rounded and minutely spined ... 3.

The ventral plate beneath segment 10 of the female forked or bearing long spines
... *Gynacanthaeschna sikkima.*

(Thorax blackish brown marked with grass-green.)

3. The frons uniform olivaceous, unmarked with black
... *Cephalaeschna orbifrons.*

The frons glossy black in front and along crest, yellow above. ... *Cephalaeschna lugubris.*

4. The nervure *IRiii* unforked ... *Jagoria martini.*

The nervure *IRiii* forked beneath or just before the level of the pterostigma ... 5.

5. The cells between the nervures *IRiii* and *Riv+v* not distinctly arranged in rows; *Riii* slightly and broadly convex only towards the pterostigma
... (Genus *Aeschna*) ... 6.

The cells between *IRiii* and *Riv+v* distinctly arranged in transverse rows; *Riii* abruptly convex towards the pterostigma as in genus *Anax*
... *Anaciaeschna jaspidea.*

6. The ventral plate of female lying beneath segment 10 rounded and minutely dentate ... 7.

The ventral plate of female lying beneath segment 10 produced into a point which bears several robust spines
... *Aeschna erythromelas.*

(Superior anal appendages spatulate and coated with long hairs; abdomen reddish brown spotted with yellow.)

7. (Superior anal appendages paddle-shaped or shaped like a tennis racket; abdomen black marked with blue spots ... *Aeschna petalura.*

Superior anal appendages narrow for the basal two-thirds, the apical third then broadened and, viewed in profile, shaped like a bird's head; abdomen black marked with green ... *Aeschna ornithocephala.*

Gynacanthaginae.

1. The ventral plate beneath segment 10 of the female ending in 4 robust spines; pterostigma in the hindwing of male quadrate, extending back into the space posterior to the pterostigma
... *Tetracanthagyna waterhousei.*

The ventral plate beneath segment 10 of the female prolonged and forked, ending in two long fine spines
... (Genus *Gynacantha*) ... 2.

2. Frons without any markings on its upper surface
... *Gynacantha lyttoni.*

(An olivaceous species with greenish thorax.)

Frons with its anterior border black, or with a black T-shaped marking above ... 3.

3. The hindwing less than 40 mm. in length, the abdomen not more than 41 mm. long ... *Gynacantha o'doneli.*

(A very small species with enfumed wings and olivaceous colouring throughout.)

The hindwing more than 40 mm in length, the abdomen not less than 44 mm long ... 4.

4. The frons bordered with black anteriorly; the 3rd segment of abdomen only very slightly constricted
... *Gynacantha bayadera.*

(A species closely similar to *Gynacantha lyttoni* but with markings on the upper surface of head.)

The frons with a black T-shaped marking on its upper surface; the 3rd segment of abdomen markedly constricted ... 5.

5. All abdominal segments from 3 to 8 with diffuse black apical rings; no blue markings present
... *Gynacantha hyalina.*

(A large species with very broad wings and body coloured pale grey marked with blackish brown or black.)

Abdomen black marked with bright azure blue
... *Gynacantha hanumana.*

(A large species with moderately broad wings and body dark coloured, marked with blue on the abdomen)

Abdomen uniform dark brown without any blue markings ... *Gynacantha subinterrupta.*

(A species very similar to the last but without any blue markings on thorax or abdomen.)

Chlorogomphinae.

1. Thorax with antehumeral, humeral, posthumeral and two lateral stripes ... *Chlorogomphus preciosus.*

   Thorax with only antehumeral and two lateral stripes 2.

2. Face a uniform dull pale brown without markings ... *Chlorogomphus atkinsoni.*

   Face black brightly marked with citron yellow ... *Chlorogomphus selysi.*

Cordulegasterinae.

1. Hindwing of male rounded at base; no anal triangle at base of hindwing: no oreillet processes on the sides of segment 2 ... (Genus *Anotogaster.*) ... 2.

   Hindwing of male strongly angulated at base; an anal triangle at base of hindwing; oreillet processes well developed on sides of segment 2 (Genus *Allogaster.*) 3.

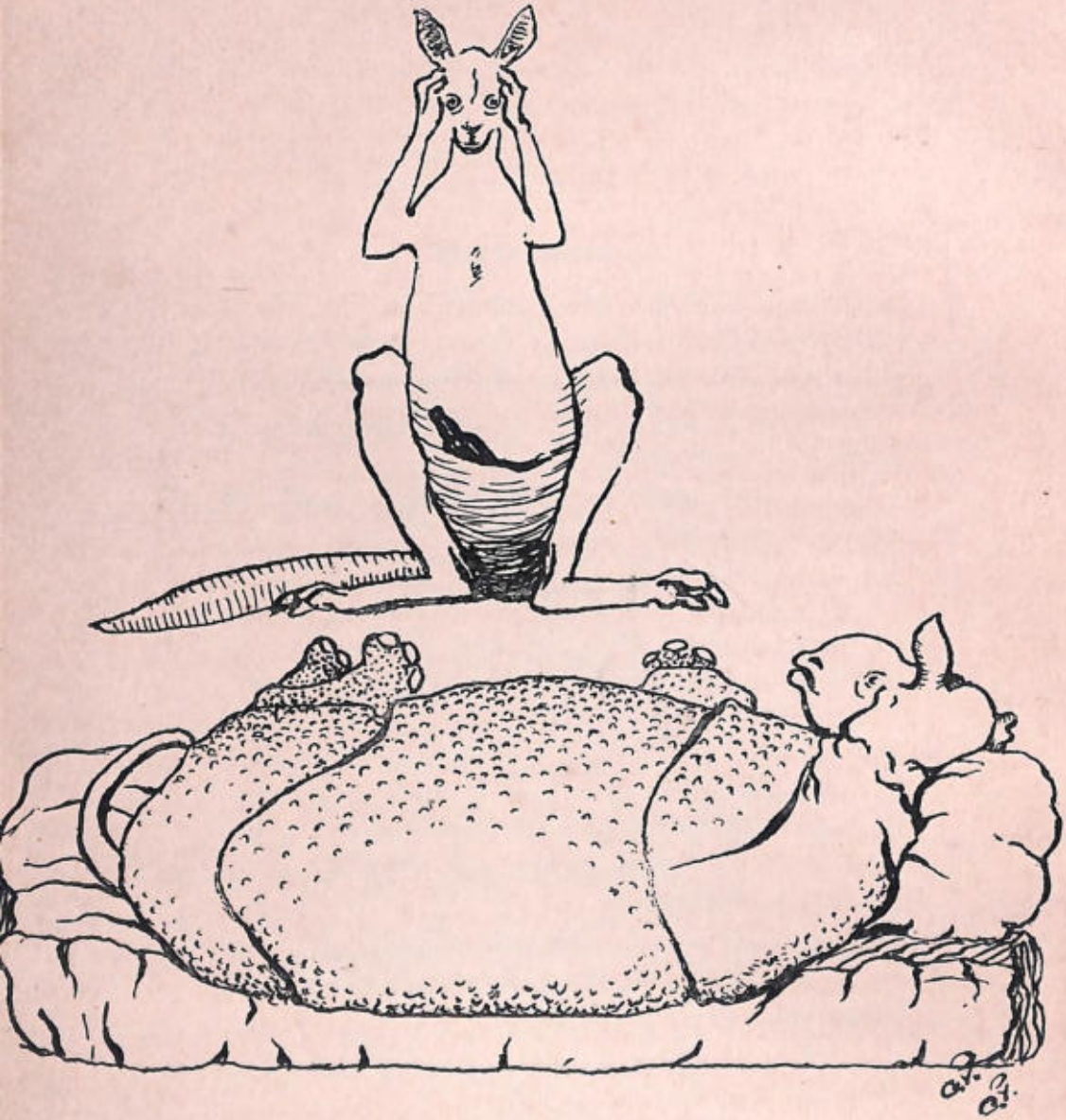
2. The whole of the veins of wings black ... *Anotogaster nipalensis.*

   The costal and first antenodal nervures, costal and distal sides of the discoidal cell bright yellow ... *Anotogaster basalis palampurensis.*

3. Four yellow spots on the dorsum of segment 2 ... *Allogaster latifrons.*

   A single saddle-shaped spot and two yellow lunules on the dorsum of segment 2 ... *Allogaster hermionae.*

(To be continued).



He clasped his head between his hands and thus to me did say.

"The feeding of wild animals in Captivity".

To The Editor.

DEAR SIR,

I was interested to note in your Journal No. 1 of Vol. IX that in the article on the great Indian one-horned Rhinoceros calf it is stated that as regards her diet "she remained on the milk diet until November, when it was decided that she would be better looked after in the Calcutta Zoo, she was then put on to a diet of bottled rice, with ghur and milk with which to wash it down" I presume this change in her diet was made in order to accustom her to what she would be given on arrival at the Calcutta Zoo. It seems a great pity that a young Rhino calf should be encouraged to become a dipsomaniac by being given "bottled rice" and one can only hope that the same diet is not given to *all* the animals in the Calcutta Zoo. If it is, then I fancy that, if one could catch that young Rhino when, if ever, she is comparatively sober and get her to relate her experiences whilst in the Zoo, she would tell one something like this. I am presuming of course that she has free access to Mr. R. Kipling's work and that the effects of "bottled rice" occasionly wear off sufficiently to allow of her reading print.

"I had seen as dawn was breaking and
I hiccupped on my bed
That my pal the humble Hippos eyes
were exceeding wild and red
I had noted that the Hoolock was unsteady
on his pins
While *Barbus tor*, the Mahseer, could no
longer use his fins

2

In the early hours of morning I observed
the Mugger run
To and fro across the ceiling and presumably for fun
Then a Kangaroo came hopping in a most uncertain way
He clapsed his head between his hands and
thus to me did say

3

Oh ! Rhino, wealthy Rhino have you got a drop to spare
My head feels full of cotton wool I am neither
here not there
But one good drink of "bottled rice" I feel
would put me right
The fact is since I ~~have~~ tasted it I just love
getting tight."

With apologies to R. K.

C. PRIMROSE.

[We have not got the original letter but have no doubt that "boiled rice" was what was intended. With many apologies for the bloomer. *Editor.*]

DARJEELING NATURAL HISTORY SOCIETY.

The Society was started about the end of 1923, the objects being to maintain the Museum in a proper condition; to promote the study of Natural History and to get together, as complete as possible, collections of Natural History specimens from a limited area, including "the civil districts of Jalpaiguri and Darjeeling and the State of Sikkim", as well as what could be procured from the neighbouring countries of Tibet, Bhutan and Nepal.

The Government and Municipal grants not being sufficient for our purpose, it was proposed to enrol members so as to increase our funds, and a Quarterly Journal has been started. It is hoped that everybody will join the Society and co-operate to make the Museum and Journal a success.

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FRANCOLINUS FRANCOLINUS MELANOTUS

The Assam Black Partridge

2/5 Nat. size.

JOURNAL

OF THE

DARJEELING NATURAL HISTORY SOCIETY.

Vol. IX.—No. 3.

Game Birds of Sikkim, including the Darjeeling District, and of the Jalpaiguri District, Bengal.

By

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

(*Continued from page 3.*)

We now come to the genus *Francolinus* a very large group of Partridges, especially in Africa, but also represented almost throughout temperate and tropical Europe and Asia. The tail has 14 feathers and is rather more than half as long as the wing; the legs are usually spurred but, sometimes, the spur is obsolete. The sexes are alike or dissimilar. There are ten species and subspecies in India, of which only two occur in our area.

(41). The Assam Black Partridge.

Francolinus francolinus melanonotus Hume.

(*With a coloured plate.*)

A short description of this Francolin, with the coloured plate, was given by us in the Journal Vol. VIII. No. 2. We again issue this coloured plate as it may be of interest to those members who have not got the earlier Journal.

There is no necessity to give a description of this Partridge as the coloured plate represents both sexes. The cock is shown calling from the top of a stump, in thatch grass, and the hen is at rest.

This is the darkest race of the three found in India. Hume mentions an albino obtained by Hodgson in Nepal,

which was "a sort of a delicate lilac-grey ; the ear-coverts and body spots greyish white ; the back, rump and upper tail-coverts barred as usual, but with greyish dusky ; but the broad neck ring dull chestnut, and the lower tail-coverts bright ferruginous chestnut." Hume gives the weight of a cock of our race as 1 lb. 2 ozs. and that of a hen as 14 ozs. (*Stray Feathers Vol. XI. p. 305.*)

The chick in down is described by Stuart Baker as "very richly coloured, the dark portions, including the crown, are broader in extent, a richer darker chestnut brown, whilst the fulvous below is also much deeper". This is as compared with chicks of the other races. He describes the chick of the Indian Black Partridge as "Head bright rufous with darker crown and with paler supercilia and cheeks and a darkline through the eyes, above brown with a very pale buff streak on either side of the back and rump ; chin whitish, neck and throat fulvous-white and rest of body below dull earthy white."

The distribution is given by Stuart Baker as "Eastern Nepal, Sikkim, the whole of Assam and Eastern Bengal, Manipur, Lushai, the Hill Tracts of Chittagong and Tippera. Birds from Central West Bengal are also nearest this race, as are those from Orissa, though somewhat intermediate."

Although Sikkim is given as one locality we know not on what authority. Stevens does not mention it in his "*Birds of the Sikkim Himalayas*" nor do there appear to be any specimens from Sikkim in the British Museum.

It used to be common in the Duars but has been pretty well exterminated except in some favourable spots. This is due, partly to large areas of savannah having been opened up, but, principally to the tea garden coolies who, besides taking the eggs, capture the birds. Travers says the Sonthals run down many a Partridge. This bird is also found in the Terai.

They are particularly fond of grass land, either in those large extents of savannah which have not been desecrated by the tea bush or other cultivation ; this reminds me of a report of a greatly lamented Divisional Forest Officer in

which he said :—"What was once a smiling savannah is now a howling wilderness of tea"!!, or else in the smaller patches of thatching grass in tea gardens. They will also come into the tea itself and breed there. They are not as often found in forest or scrub as is the Indian Black Partridge probably due, as Stuart Baker surmises, to the greater density of the forests in the areas where this subspecies is found. In Goalpara, in Assam, we have seen them rise out of *ekra* jungle and once had the satisfaction of bringing down one of these birds with the first barrel of a 12 bore and a Swamp Partridge with the second one. Colonel Wood writes in his interesting book *"Shikar Memories"* that in Manipur they are often found in springy, peaty bogs along with Snipe. With us they seem to be strictly confined to the plains but elsewhere they, at any rate, occur as high as 6,000 feet and on occasions even 8,000 feet, and are said to sometimes breed at 6,000 feet. They are seldom known to perch at any height from the ground but, in Hume's time, Greig wrote to him that he had seen them perch high up in Chir trees (*Pinus longifolia*) in Garhwal and Young also came across one doing the same in Kulu. Recently Riches, in the Duars, saw two perched about 15 feet up in a *Siris* tree in the tea.

Their note is very cheery and full of the *joie de vivre* and they may be heard calling at early dawn and dewy eve and also at other times of the day. They are most vociferous during the breeding season. The cock calls from some eminence such as a stump of a tree, an ant-hill etc., and the call has been syllabalized in various ways both by Europeans and Indians. The vulgar say it is *"lahsun, piaj, adruk"* (garlic, onions, ginger) and devout Mahommedans render it as *"Subhan tere kudrut"* (Oh! Omnipotent one, thy power *who shall fully describe* ?), which is the beautiful Mahommedan superstition that all birds and beasts welcome the dawn with some prayer or thanksgiving. The best English rendering is *"Be quick, pay your debts"*; Very sound advice if one can do so!

Higgins gives some most interesting notes on this Partridge in Manipur. He says the Manipuri version of the

call is "mitaret, thang taret ('seven men, seven daos') referring to a folk-lore which ascribes the origin of the bird to a man who was set on and killed by seven rivals in the jungle". He also writes "what is strange is that no one appears to have noticed that the call consists of *seven* distinct syllables, not six or five, the first being separated from the rest and very short and sharp. This may be due to the fact that the first syllable is so sharp as to be far less audible then the rest. Indeed some persons find difficulty in hearing the call at all, and I knew one man, whose hearing was normally perfect, who was completely deaf to the call of a bird sitting even a few yards away. The whole call may be represented as *'tk : pss ps-wss ps-wss-wss'* with a pause after the first, second and fourth syllables which are accented." (*Journal Bom. Nat. Hist. Soc. Vol. XXXVII p. p. 90-92.*)

We find considerable difficulty in pronouncing the above series of consonants! Whistler describes this call note well as *Che-Chirree, Chick-Chiree.*

They are monogamous and probably pair for life and, except after the breeding season, coveys are not usually seen. They are very peaceful birds and even during the breeding season apparently never fight each other as other game birds so commonly do. Hume wrote! "After all they are only birds; and all having wives of their own, their little rudimentary minds are incapable of grasping the manly predilection for possessing themselves of their neighbours' spouses."

They give excellent sport, whether shot on foot, with a string of beaters or with dogs, or from the back of an elephant. They rise perpendicularily and fly strongly and straight but are not as fast as the English Partridge.

Higgins considers this Partridge to be "a tame bird and not a very fast flier, and is very easy to shoot. I fear that few flushed escape uninjured".

They are great runners especially the cocks. Colonel Wood says they soar very high and then drop down dead when

shot in the head and neck, other birds very often do the same. Large bags appear never to be made, such as those made with the Indian Black Partridge. Hume writing, in 1880, about the latter bird said :—"fifty brace may still be bagged in a single day by a single sportsman, and in past times 60, 70 and 80 brace have been thus brought to book."

They feed principally in the morning and evening, their food consisting of seeds, grain, insects, the tender shoots of grass and mustard etc.

Colonel Wood writes that, in Manipur, they are very fond of a blue berry which grows on bushes and, where these are found, the birds are very plentiful. (*Shikar Memories p. 26.*)

O' Donel told me about a curious accident which happened to one of these birds. It was startled from the tea by a plucking coolie and, on flying off, hit its head against the branch of a tree and was killed.

They are resident birds and lay from April to July. In the Duars they lay in May and June, but Cripps found a nest in the Western Duars on the 16th July, containing five fresh eggs. Where found in the hills they breed in April. The nest is usually an ill-formed pad of grass, though sometimes compact, placed in a hollow scraped by the birds in the ground in grass land, under a tea bush or sometimes in scrub jungle or ekra. They lay from 3 to 10 eggs, usually 4 to 6, which may vary in colour from stone colour to olive chocolate-brown or dark olive-green. The average measurements of 100 eggs are, according to Stuart Baker, 36·5 × 30·9 mm.

As table birds Black Partidge are quite good eating, though, if only roasted, they are apt to be dry.. In a stock pot they are excellent and as Hume wrote "although neither very tasty or gamey, the flesh is white and sweet and if cooked gipsy fashion, they will be found, with good bread sauce, a very welcome addition to the camp bill-of-fare."

Higgins, however, considers this bird to be excellent eating, if well hung and well worth roasting.

They do well in captivity and can, except during the breeding season when more care is necessary, be allowed a good deal of freedom. They have lived for over ten years in the Alipore Zoological Gardens.

Some Observations on the Bird-List of Sikkim.

BY

DR. SATYA CHURN LAW, M.A., Ph.D., F.Z.S., M.B.O.U.

A propos of Mr. W. H. Matthews' paper entitled "Some Notes on Birds in Sikkim" and the editor's Supplement appended thereto (published in *J. D. N. H. S., Vol. VII, 141*) I notice some omissions in the list of bird-fauna of Sikkim. I mention these specially with my remarks as recorded in my note-book during my trip to the Changu Lake in June (1933) last.

Grammatoptila striata sikkimensis Ticehurst. A specimen, female, obtained on June, 19 about half-way between Gangtok and Karponang.

Measurements :—Wing 139 mm. ; Tail 139 mm. ; Tarsus 43 mm. ; Culmen 24 mm.

Observed to affect in small parties creeper-entwined trees on the road-side.

Mesia a. argentauris Hodgs. Observed at Gangtok on June, 15. Affecting in pairs garden trees in the town. Also observed to affect trees lining the bridle way to Karponang.

Turdus atrogularis Jarocki. A nest with three young collected on June, 20 from a patch of forest below the Residency at Gangtok.

Juvenile coloration :—Whole upper plumage dark brown washed with fulvous, the latter conspicuous on forehead, wing-coverts and edges of wing-feathers ; of the

head and back with ochreous shafts; the wing-coverts tipped ochreous in the centre; lores dark brown with fulvous superciliary streak above; ear-coverts mixed brown and fulvous; chin and throat light fulvous or fulvous-white, streaked with black; breast and flanks fulvous, the former boldly spotted with black or darker brown, the latter suffused with ochre and streaked with dark brown; abdomen and vent and under tail-coverts fulvous-white.

Bill, legs and feet brownish yellow.

Of the three young, one successfully hand-reared has been added to my aviary.

Otocompsa jocosa emeria (Linn.)—Observed at Gangtok.

Molpastes l. leucogenys (Gray.)—Observed on the way to Karponang affecting tops of very tall trees which are not infrequently covered with creepers.

Ixos m. macclellandi (Horsf.)—Rather common and found in pairs. Specially noticed in a patch of lighter forest below the Residency.

Uroloncha p. punctulata (Linn.)—A flock observed at Gangtok on June, 19. Evidently nesting, a few birds found with nest-materials in beak.

Perissospiza icteroides affinis (Blyth.)—A specimen, male, obtained at Changu. Found in Rhododendron bushes.

Hypacanthis s. spinoides (Vig.)—Two specimens, male, female, obtained between Gangtok and Karponang.

Bears.

The Editor's request at the end of Col. Wood's very interesting article on bears in the Journal of April 1934 calls for a response from the shikaris of the district and I trust that some of us will be able to give information on the subject of the sub-species mentioned. I have never taken the trouble to investigate the difference to which our

Editor alludes, but, I know that the local hill people recognise three species of bear, *viz.*, a very large bear, a bear of medium size (about 240 lbs. in weight), and a tree bear. With regard to the last named: I think Shebbeare explained in an article some years back that the so-called "tree bear" is nothing more or less than a cub. It is this youngster that is responsible for the 'nests' in trees one so frequently sees during a ramble in the forests in the cold weather months, and, these bears may be shot in trees in December when they are quite likely to be found feeding on the berries of the 'khurranay'. I tried to bag a specimen last year but without success, and think it would definitely clear up any doubt on the subject if one of the local shikaris would send the skin and skull of the next tree bear he shoots to the Editor for identification, especially as opinions differ on the matter and the hillmen stubbornly hold to the belief that it is an arboreal species as quite distinct from other bears.

McNaught says he shot a "tree bear" in the forest above Tumsong many years ago which was a very small animal with old and worn-out teeth.

It may be that the very large bear and the one of medium size answer the differences to which the Editor alludes, but, on the other hand they may be of the same species, as bears take a long time to reach maturity. I know this from a bear I kept in captivity. I am inclined to think however that the bear we get is the *Selanarctos. t. thibetanus*, as in all the bears I have shot the white collar has always been round and never V shaped as mentioned by Pocock with reference to *Selanarctos t. laniger*.

My experience is that the bears up here do not hibernate in the full sense of the word and have often been shot during the cold weather months. Nevertheless, they appear to be in a state of semi torpor and lie up in caves from which they only very occasionally come out to feed.

Col. Wood mentions four ways of shikaring bears in Assam, and I agree with him that tracking them up is

hopeless, as, after a few painful experiences, I soon concluded that this was sport more suited to the enthusiastic griffin who has no objection to an intimate acquaintance with leeches and strenuous climbing in inclement weather, to result in only a blank at the end of the day's trek. Bears are usually shot up here during the monsoon months when they emerge from their winter's semi torpor rather emaciated and hungry for a bellyful of Indian corn! Greed is Bhalloo's predominating characteristic, so after having gormandised he is generally not prepared for a long journey and will consequently lie up in a convenient patch of jungle not far removed from his feeding grounds, and, once one is able to locate the patch he is in, the shooting of Bhalloo does not present very great difficulty. All the shikari has to do is to take up a position in the most likely break when the beaters will do the rest. However, it is more about Bhalloo's voracious and catholic appetite that I am interested, and although his diet is chiefly that of a vegetarian his palate is not averse to carrion, human flesh, cattle killing and cannibalism. It is a known fact that bears in this district will exhume a putrified goat or cow and indulge a meal. Last year, about the time of the Durga Pujahs in October, a buffalo died while on its journey to one of the gardens and was buried in the forest below Lepcha Juggat where it was nosed out by bears and devoured. Some years ago my Wife shot a bear which we afterwards discovered had a couple of cubs that had been seen by the beaters. On the following morning we heard that there were a couple of big bears in the same forest so I arranged to beat for them and also hoped that we might be able to capture the cubs. No sooner had the beaters entered the jungle when pandemonium ensued and the din of a noisy bear and excited beaters indicated that something was wrong. I could not understand what had happened and concluded that the beaters had been attacked but the cause of the disturbance was soon apparent when the beaters came out carrying with them a couple of dead cubs. The beaters had come across two large bears actually fighting for the cubs, one of which had been three quarters eaten and the other just killed!

A few years back a very large bear had taken to cattle killing just below Tonglu. I sent a reliable Chowkidar there to investigate, and judging from the size of the pugs of which the Chowkidar brought measurements, the bear must have been enormous. It was killing cows and ponies frequently so I asked the villagers to send me khubber the next time there was a kill. However, 'khubber' was not forthcoming, as a village shikari decided he'd settle the bear. A large cow was killed in due course so the village Nimrod, after first collecting a handsome subscription from the villagers and cowherds (in anticipation of services about to be rendered!!), sallied forth and came across the bear fast asleep near the kill in broad daylight. He fired and hit the bear which went off. Thereupon Nimrod returned to the village as the enormous size of the bear unnerved him, but, after bracing up his courage with 'the cup that cheers', he returned to the attack with a few village stalwarts to administer the *coup de grace* if necessary, and amongst the stalwarts was one who carried a spear! In the course of the follow up they were surprised by the bear which struck down the man with the spear who happened to be leading and then charged Nimrod whose cartridge had misfired. Poor—Nimrod it just rolled down the khud with him. Nimrod's friend had been scalped and was carried into the Victoria Hospital where he recovered. The villagers were too frightened to follow up on the day of the accident as the bear was vociferating and continued to vociferate throughout the night. However, on the following morning the trail was followed up and they came across Nimrod who had not only been killed but a considerable portion of him had been eaten. The bear was watching over Nimrod and was driven off by the villagers none of whom knew how to shoot. The bear was never heard of again and I expect died of its wound.

Bear shooting will afford sport in these hills for many years to come as I don't think they will ever become extinct despite the increase in firearms. A bear shoot is generally the source of much merriment, for the comical appearance and gait, which is slow and clumsy, seems to arouse the

sense of laughter among all concerned, and the hill people always dwell with great amusement on what we would call a 'narrow shave'!! Actually, a bear is slow with very poor eyesight, so, with ordinary precautions, there should never be any accidents. Major General Woodyat tells the story in 'My Sporting Memories' of a Major who wagered a bet that he would approach and smack a sleeping bear over the buttock and then shoot it. This intrepid humorist is reputed to have won his bet!!!!!

Tumsong T. E., T. A. BALDRY.
29th June 1934.

A Supposed Giant Deer.

I remember reading somewhere about the faking of horns, I think it was in Kashmir, which is rather interesting as apparently the Germans were very proficient at this art about a century ago. In the last *Proceedings of the Zoological Society of London 1934. (July 1934)* there is a very interesting note, under the above heading, by Sir P. Chalmers Mitchell, the Secretary of the Society. I quote it as it may be of interest to our Members showing how *Record* heads have sometimes been made. A correspondent had asked for further information about some gigantic Red Deer antlers described in the Proceedings. The reference is :—"Mr. Fraser exhibited for Lord Powerscourt an enormous pair of antlers with forty four points, supposed to be those of the Red Deer, from the Carpathian Mountains. Their weight was stated to be seventy four pounds, the length of each antler 5 feet 8 inches, following the curve, the distance direct from the base to the tip of each antler being 4 feet 3/2 inches, the greatest width of the antlers 5 feet 5 inches. The following was Lord Powerscourt's memorandum respecting this remarkable specimen :—

"This pair of horns was bought for me by the Hon. Julian Fane, at Vienna, about six weeks ago. The history he got with them was that they had belonged to a person who lived near Kronstadt in Transylvania that they were

sold out of his Schloss, on his death lately, and bought by a travelling merchant, who again sold them to a burgher of Vienna, from whom Julian Fane bought them for me for £50. (*P. Z. S. 1862 P. 142.*)

Sir Chalmers Mitchell wrote to Lord Powerscourt, the son of the owner referred to, who replied that many years ago he had examined the head that it was not a genuine but a real work of art. In a subsequent letter, dated March 9th 1934. Lord Powerscourt wrote :—

"The mounted specimen is of terrific weight, having a *papier máché* head, such as the Germans made around important heads at that time. The animal's head is large out of all proportion, so as to be in proportion to the gigantic horns. I found on scraping part of the horn near the skull, that this was cleverly made up of plaster, so as to give the requisite thickness to support the rest of the horns. And then going higher up, I found that the points and tops of other horns had been very cleverly let in, or dovetailed into the main thick horn, having an unbelievably natural effect, except that in my opinion, from experience, when a red deer's head shows, say above 25 points, these are always palmated at the top, not single points sticking out from the main branch."

This faking must have required very great skill but apparently was quite a lucrative form of employment judging by the price paid for this remarkable head.

24th August, 1934. [*The Editor.*]



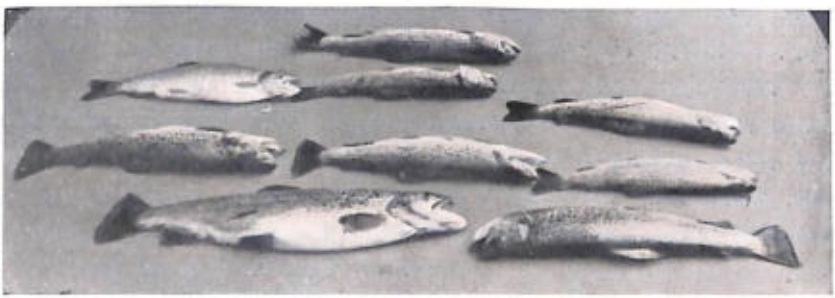
Hotel Sommerberg, Wildbad.



Pine Forest Near Hotel Sommerberg.



WILDBAD TOWN AND RIVER ENZ..



A FINE CATCH.

Continental Fishing.

By

Col. H. S. Wood I.M.S.

(With two half-tone plates).

I am writing this article for the benefit of my fellow fishermen in India who may wish to find a suitable place for Trout fishing, on the Continent, whilst they are on leave from India, or on retirement.

I must say that I was disappointed with Trout fishing in England, although it may be good in Scotland. The tarring of the roads and sheep dipping, and the effluent from beet and other factories have played the devil with fishing.

I consulted various travelling bureaus in London but could get no definite or reliable information so I was determined to find out for myself. Corsica was highly recommended so I went there first. I found the fishing disappointing. Lovely trout streams and scenery but not a living thing as the rivers were either dynamited or netted by the inhabitants. With strict preservation and the annual introduction of fry, the streams would become a fisherman's paradise. With regard to other game in Corsica, although advertisements describe it as teeming with game, be not deceived as everything is being wiped out. During my stay of seven months during which I tramped the greater portion of the island I only saw four Partridges and one Quail. The only birds that seem to hold their own are the Rock Pigeons and they offer fine shooting from a boat as they dash out from their rocky caves. They cannot be potted sitting by the Corsican sportsman (?) and on the wing they fly too fast for the potter. Corsica used to abound in Moufflon (wild sheep) but they too, now, can be counted on the fingers of one's hands. I was very anxious to shoot a good head for my collection. I arrived at Calvi during the so-called close season but the Hotel manager told me he could easily get me a pass !! During my stay

at Calvi there was a heavy snow-fall and the Moufflon were driven, by stress of weather, down to the low country ; one of the residents went after them and shot four ewes ! ! ! Every " busti-wallah " in Corsica is armed with a gun and everything is shot, Robins, Chaffinches and Blackbirds, the latter are in great demand at Marseilles and Nice for special pies for the greedy *gourmets.* When the arbutus is ripe, Blackbirds are attracted and every ship proceeding to the mainland carries huge numbers of these birds. When Corsica was overun by bandits the French Government was very particular in issuing licenses ; but now everyone is armed with some sort of gun. I dislike the Corsican, he is cruel, sullen, morose, lazy and bad-tempered. Nowhere else does one see animals and birds so cruelly treated ; parents even giving their children live birds, tied with wire or string to a stick, to play with. My wife and I used to come across these play things ! ! with the poor victim dead, probably a happy release.

The towns and villages in Corsica are very dirty, the conservancy staff paying a visit every six weeks or so. Apart from these drawbacks the country is lovely and the wild flowers beautiful, " every prospect pleases and only man is vile." It is a pity England did not stick to Corsica we would have made a better job of it than the French.

My next visit, in quest of Trout, was to the Dolomites. I found all the streams flowing in rocky ravines with the sides covered with large boulders, one required the sure-footedness of a goat to get over them. I paid through the nose for a license and the total of my bag was one Trout about 6 inches long. The Trout, if there were any, did not take fly and one had to fish with worm, a thing I detest doing.

I next tried Switzerland and, here too, it was a wash out. The length and breadth of Italy was also traversed in vain. Here dynamite, netting and the withdrawal of water for hydro-electric power had played havoc with the fish.

I next visited the Austrian Alps, the Salz Kammergut, I made Alt Ausee my headquarters. The fishing here was

fair in the rivers but expensive, running into 12 shillings a day including the man whom the Forest Department insisted on going with one. This individual was armed with a tin barrel and the fisherman had to bring back all his Trout alive and present them at the Forest office; a 25% reduction was made off the market value, if one wanted to take some home for supper. The proprietor of the hotel had the fishing rights of the lake on which his hotel is situated and he gave me permission to fish provided I gave him all the fish I caught. I got some good lake Trout, averaging 7 lbs.. and some Char. They took the brown minnow trolling and spinning well, but would not look at anything else. Salz Kammergut is very beautiful and the mountain lakes, situated in the heart of the pine forests, are a dream of beauty. The people are very nice and friendly.

I was advised to visit Germany so I got a list of all the fishing places from the German Bureau in Berlin, determined to visit them all, whatever it might cost, this was 3 years ago. Many of the places were not worth visiting such as Hirsdu Boll; Schwarzbourg in Thuringia and the Eiffel district. The latter place was tremendously puffed but all I caught there was one quarter of a pound Grayling. I was told that before the Army of Occupation (American) the place was very good but dynamiting and netting by the troops had played sad havoc, also new tanneries are being built on the bank of the river so that Trout fishing has been killed.

I then visited Wildbad in the Black Forest and it turned out trumps and I doubt whether its Trout fishing can be surpassed anywhere. First class accommodation can be had and the country is beautiful. There are miles of pine forests with paths well laid out and notices indicating the various places, with distances, so that it is impossible to lose one's way. There is a Kursaal, daily concerts and a wonderful curative water which is a panacea for all ills, and wonderful baths; people flock from all parts to be cured of their ills and the results, in many cases, were truly marvellous, The story goes that the waters were discovered by some hunters years and years ago. They were chasing a wounded

Boar and, ultimately, came on the animal standing in the spring and drinking the water.

Here is a fishy (!) story with regard to the curative properties of this water. One day I asked my barber. "Have you any faith in the baths and water?" I was, myself, taking them at the time and as he was an old inhabitant I thought his opinion valuable. "Oh, yes!" he exclaimed, "the fish that escape after being hooked, or those that are returned to the water by fisherman, all come up to a part of the river, where the used water of the baths flows in, to be cured of their wounds." He said this in all seriousness but I could not make out whether he really believed it or was merely pulling my leg.

Wildbad is easily reached from England *via* the Hook of Holland, or *via* Ostend, through Belgium. From the South of Europe the route is through Basle and the beautiful Rhine Valley. All the people in the Black Forest are very nice and we always received the greatest kindness and hospitality. The fishing at Wildbad is under Government control. The Enz is the river and there are about 15 miles of lovely stretches of pools, weirs and rapids suitable for dry and wet fly fishing. After rain the river clears rapidly and there is no snow water to disturb one. The river meanders through lovely meadows, sweet with flowers and pine forests rising up on both sides. It is very strictly preserved, the Government employs a large staff to patrol the river so, when fishing, it is always advisable to have your permit with you, otherwise one is marched off to the nearest police station causing much annoyance, inconvenience and delay.

The river flows through the pretty villages of Calm Bach and Hofen and joins the Eyach where the fishing rights end. The fishing begins at a place called Nonemiss on the West. The river flows practically East and West. The Government has its own hatchery and, yearly, between five and six thousand fry are put into the river. I visited the hatchery and was much interested in the various operations. The milt spawn are mixed and put into a perforated zinc

plate ; when the young are hatched they get through the perforations into the water trough below. The fish, according to size, are transferred to a series of tanks, with fresh water running through. The fish are fed on a mixture of horse flesh and bones, mixed with meal, a most unwholesome and smelly mixture, which is all ground up in a mill. At feeding time the water of the tanks absolutely boils with the fish. From a commercial point of view these hatcheries pay well. The hatcheries supply all the hotels ; the fish can be kept alive for a 24 hours journey by rail by putting them into covered wooden vats. Into this cylinders of oxygen are inserted and the gas slowly released through a small pipe. For live fish which reach their destination the price is from 2 to 4 marks a kilo.

Rather an amusing incident happened one day at one of these hatcheries when I took a man and his wife to see one. The proprietor was explaining how he got the male fish and squeezed it for the milt and then the female fish likewise for the ova ; then he said "I mix the two and the youngsters hatch". The lady exclaimed "Is that all ? Poor fish" !

Where the Enz flows through the park and a part of the town one is not allowed to fish. Below the town there is a large paper factory and several saw mills. The fish, for some reason, eat the paper pulp and sawdust hence the Trout caught in the waters are not relished by most people as they taste of brown paper and sawdust. The Germans, however, have no compunction and I used to supply policemen, the grocer, barber, band conductor and most people in the hotel with the result of my captures. Above the gardens, for a long way, they are clean run, with canary coloured bellies and beautiful red spots ; very strong and most excellent eating.

The banks of the Enz are kept clear of bushes and trees, for the most part, so as to facilitate casting without being hung up ; but it is advisable to be an expert at the side cast, as it is just in these places that the big trout lie. There are some splendid weirs where fish congregate but it

is not advisable to fish these on a Sunday as Tom, Dick and Harry are all out for a swim and scare the fish. One stout, old Colonel, who was exhausted when I took him for fishing, along the whole length of the rights, sat down for 4½ hours, another day at one of the weirs for 4 hours and bagged 17 good fish. In the upper waters not a single Rainbow Trout is to be got ; they seem to stick to the lower reaches where the current runs swift and the water is deeper.

The State lays down the following rules for the guidance of fishermen.

1. Nothing but fly fishing is allowed.
2. No wading.
3. In the lower reaches, starting from the Electric Works all fish below 30 centimetres in length must be returned. In the higher reaches 25 centimetres length is the minimum.
4. Not more than 10 fish are to be brought home, but this rule is not strictly observed.
5. No fish are to be sold or if they are the proceeds to go to charity.
6. No fishing is allowed in the canals supplying Hydro power to the various factories and saw mills.
7. The crops and hay on the banks of the river must not be unnecessarily damaged. As long as one sticks to the bank the proprietors do not object.
8. Night fishing is not allowed.

The fee for a months' fishing is 70 marks+10 marks State fee. At the present time about 15 marks go to the pound. I consider this fee very moderate, considering the splendid sport one gets. The fee for one day is 7 marks, so that it is cheaper to take out a month's fishing license. As a matter of fact one never fishes more than 15 days even with a month's license.

There are four kinds of Trout to be had. 1. Brown Trout. 2. Rainbow Trout. 3. A cross between the above

although this is doubted by some people. 4. The Black Trout or *Schwarz Forellen*.

Recently the State has introduced the fry of an American Trout. (I cannot identify this variety but perhaps our Editor will kindly. I attach a rough drawing of this fish with the colouration). It is a very handsome species. [Col. Wood's imported American Trout may possibly be the Brook or Speckled Trout (*Salvelinus fontinalis* Mitch). This is the only Trout which Mr. Shebbeare and myself thought it might be. Dr. J. Travis Jenkins in *"The Fishes of the British Isles both fresh water and salt" pp. 231 to 233*, says :—The Brook or Speckled Trout is one of the most beautiful, active and widely distributed of the American Trouts. It was introduced into waters on the European Continent in 1889 and has also been tried in some British streams. In Britain it invariably disappears, possibly it descends rivers and escapes out to sea. On the Continent it has acclimatized itself more thoroughly than any other American species. It is easily recognized by its colouration, the back with the dorsal and caudalfins being mottled and barred with black and dark olive. The colouration, however, like all other Salmonoids is very variable.

"The original home is the Atlantic drainage area of North America. In the United States the largest specimen recorded was 12½ lbs. weight from the Rangeley Lakes, Maine ; but the Canadian record is held by a still larger fish one of 14¼ lbs. from the Nipigon river, a Canadian tributary of Lake Superior. This trout is now reared and hatched for consumption in the New York and Boston Markets by commercial trout farmers, operating for the most part in the Eastern States. It is a good sporting fish with flesh of good flavour. When first introduced on the Continent this species and the closely allied Rainbow Trout were enthusiastically welcomed. The ease with which spawning operations could be conducted, and the rapid growth of the fish, made it, at first, a general favourite. In confined waters, such as small lakes, it easily attains a length of 6 inches in its first year, and in its second year the rate of increase of growth diminishes materially. The great

drawback to its introduction into strange waters are its cannabalistic habits and its lack of hardiness, which, especially at spawning time, proved a considerable hindrance to successful cultivation and acclimatisation." *Editor.*]

The State has also obtained a hybrid between the Gold fish and the Brown Trout and these are to be introduced. One can see these handsome hybrids in the Swanen See, a sheet of water situated in the Wildbad gardens. There are no Grayling or predatory fish in the Enz.

(To be continued).

Record Mahseer.

In *Vol. VIII, No. 2, p. 70,* Colonel Wood mentions what he believed to be the record Mahseer, one of 119 lbs. caught by Rivett Carnac in the Cauvery and a photograph was given of this fish.

On going through all the back numbers of the *Journal of the Bombay Natural History Society,* I have found the following note (*Vol. XXXIII, pp. 210 and 211*) sent by the Curator of the Mysore Museum, Bangalore.

"With reference to the record Cubbany Mahaseer, published on page 613 of the *Bombay Natural History Society's Journal,* volume XXXII, No. 3. I write to inform you that there is a head and skin of a Mahaseer caught by Mr. Saunderson, the particulars of which noted in the label are as follows :—

'Caught in the Cubbany river some 30 miles above Nanjangud on a hand line 400 yards in length. The dimensions as soon as landed were as follows :—

Length including tail from nose to end of tail	60 inches.
Greatest girth	38 ,,
Circumference inside lips	24 ,,
Weight	130 lbs.

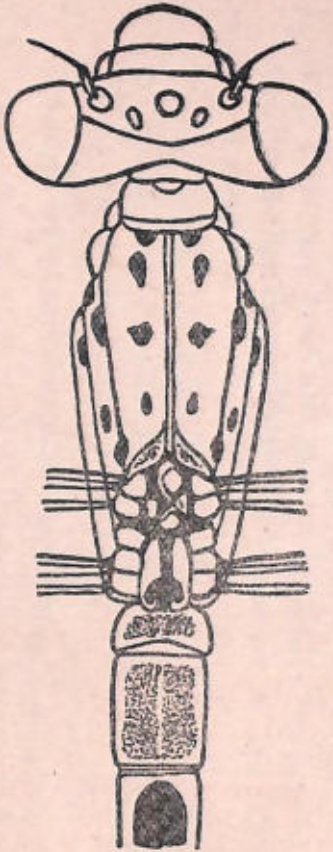
1870.

The reference mentioned refers to a supposed record for the Cubbany river given by Lieutenant-Colonel G. A. Hare whose fish measured as follows :—

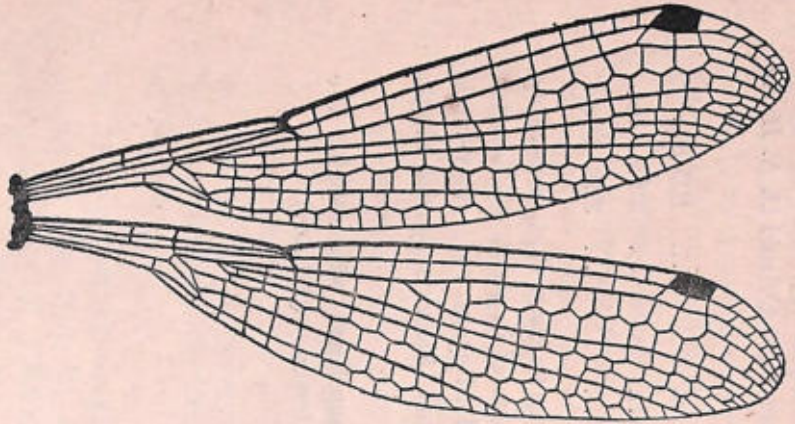
"Weight...	...	...	... 105 lbs.
Length ...	...	...	... 5 ft. 4 ins.
Girth ...	...	...	... 3 ft. 2 ins.

It may be interesting to anglers to know that, according to Colonel Hare, this fish "was landed in about 40 minutes using a Hardy 16ft. split cane Hi-Regain rod, cutty-bunk line of 40 lbs. breaking strain and Alcock's special single hook."

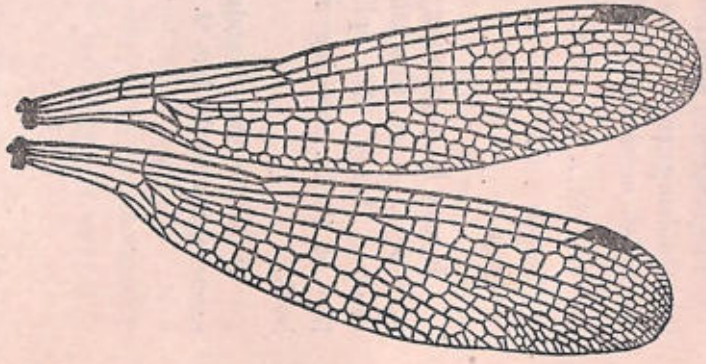
Probably the Saunderson mentioned who caught the record fish was the late G. P. Sanderson. (*Editor.*)



Head and thorax of *Platylestes platystyla* (Ramb.), showing marking.



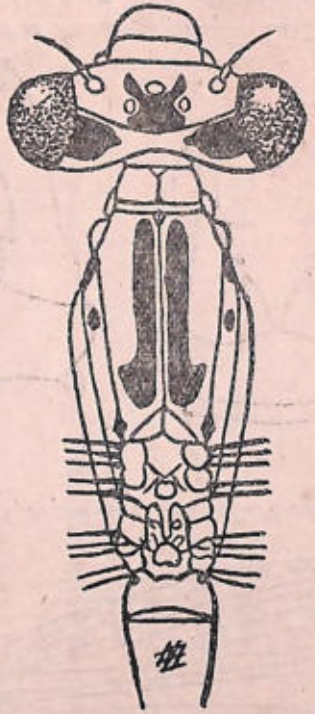
Wings of *Platylestes platystyla* (Ramb.). male.



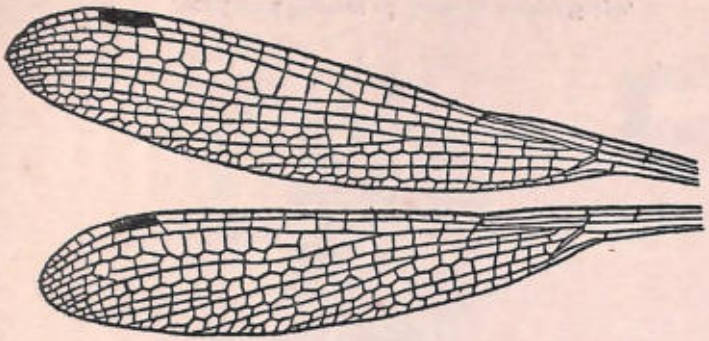
Wings of *Lestes praemorsa* Selys, male.



Head and thorax of *Lestes præmorsa* Selys, showing markings.



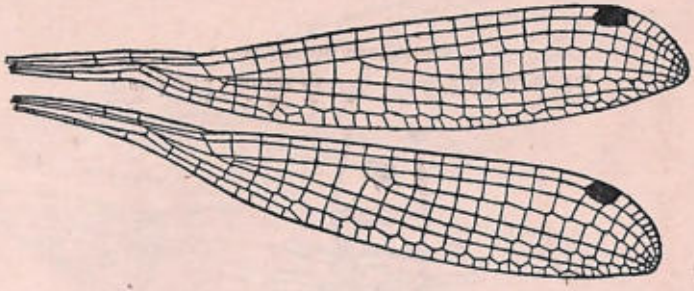
Head and thorax of *Lestes elata* Pagen, male, showing markings.



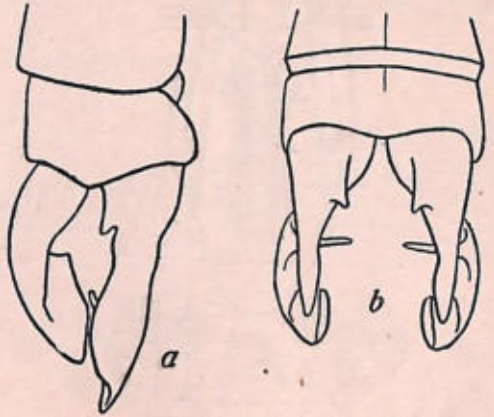
Wings of *Ceylonolestes cyanea* (Selys), male.



Fore-wing of *Burmargiolestes melanothorax* (Selys), male.



Wings of *Protosticta himalaica* Laid., male.



Anal appendages tf *Protosticta himalaica* Laidlaw, male.
a. Right lateral view. *b*. Dorsal view.

The Dragonflies of the Darjeeling and Jalpaiguri Districts and Sikkim.

BY

F. C. FRASER, Lt. Col., I.M.S., F.R.E.S.

PART IV.

With 3 plates.

(*Continued from page 84*).

In May 1927 I was able to take a month's holiday to Darjeeling for the purpose of collecting and studying the dragonflies of that district. Mr. Chas. M. Inglis had supplied me with plenty of material from that area from time to time but, with his interests occupied by other orders, it had been impossible for him to send me detailed notes as to the habits and habitats of his captures, so that it was principally for the latter that my stay in Darjeeling was made.

Unfortunately Mr. Inglis was unable to arrange a trip for me to Mangpu until late in the month so that the major portion of my stay, and most of my Shikar, was in and around Darjeeling itself. However I found plenty of streams along the Ghoom-Sonada road to occupy my energies for the first fortnight and, in the cold waters of these, I spent long hours attempting to rediscover the larvae of that most interesting Indian dragonfly *Epiophlebia laidlawi*, the imago of which has never been discovered. This insect is one of the most archaic living ; indeed it may be described as a living fossil and its discovery will make a red-letter day both for its collector and for all students of the order Odonata (Dragonflies). I quite failed to find any more larvae but, somewhere around Sonada, and probably in the month of August or September, someone, more lucky than I, will come on this much treasured insect.

Towards the latter end of the month Mr. Inglis was able to inform me that he had made all arrangements for me to go across to Mangpu to stay with Mr Shaw of the Cinchona Plantations, the latter having very kindly offered to put me up for the rest of my stay in the district. It was with high hopes that I traversed the hills on pony and foot to

make my acquaintance of hunting grounds already made famous by Mr. Inglis's and Dr. Kemp's former collections. I had hopes of rediscovering *Orolestes selysi* and *Himalagrion exclamationis*, two extremely rare dragonflies which have never been rediscovered since they were first taken around Mangpu. Here again I was doomed to disappointment but my other captures during two weeks made some amends and one new *Chlorogomphus* was discovered during my stay.

So that other collectors in that district may form some idea of what is to be had and where to look for the various species I have compiled the following list and notes for their assistance. Species starred are included in the Darjeeling Museum collection.

Systematic List.

Order ODONATA (Dragonflies).

Suborder ZYGOPTERA. (Dragonflies with the fore-and hind-wings of similar shape).

Family Coenagridae.

Subfamily SYNLESTINÆ.

Genus *Megalestes* Selys.

*1. *M. major* Selys.—Occurs in small colonies in swamps in heavy jungle. The imago may be found clinging to low herbage or fernery bordering small brooks which filter through such swamps or marshes. I found larvae in all streams below Ghoom and about Sonada; the adult insect was emerging in considerable numbers towards the middle of May. Probably widely distributed throughout the Darjeeling district. (This was also taken at Gangtok where the next was discovered. We also have it from Mangpu.—*Editor.*)

*2. *M. irma* Fraser.—This species was discovered by Mr. Chas. Inglis at Gangtok, in the middle and at the end of May. Only a few specimens were found in 1924 and no more have been taken since. Its habits are certain to be the same as those of *M. major* from which it differs by the under-side of the thorax entirely black

instead of citron yellow—a ready means of rapid identification. [In habits they do not differ, so far as we noticed, from *M. major*. *Editor*.]

3. *Orolestes selysi* Maclachlan.—The three original specimens were taken in the year 1894, since which it has never been rediscovered in the Darjeeling district. I have a specimen however which was recently taken in Laos, Siam and it has also been reported from Tonkin.

The exact whereabouts of its capture in Darjeeling is not given but was probably somewhere along the main road into Sikkim. Its dark reddish brown wings will serve as a ready means of identification should any collector happen to come across it again. My specimen was found perched on a twig with its wings closed and overhanging a still pool in the course of a small river.

Subfamily LESTINAE.

Genus *Platylestes* (Rambur).

4. *Platylestes platystyla* (Rambur). Mr. H. V. O'Donel sent me a single female from Hasimara, Duars. This species will be found haunting long grasses and scrub bordering weedy tanks and may be recognized from other *Lestes* by its square pterostigma.

Genus *Lestes* Leach.

*5. *Lestes praemorsa praemorsa* Selys.—Widely distributed throughout the plains in wet areas and certainly to be found around Jalpaiguri in similar situations to the last. It is a common insect in paddy lands and breeds in such situations. The two metallic green stripes on the dorsum of the thorax, the stripes with two lateral projections, will serve to distinguish this insect. (Our specimens are from the Duars. *Editor*.)

6. *Lestes praemorsa sikkima* Fraser.—Closely similar to the last but found at higher elevations and distinguished by an additional metallic stripe external to

the dorsal ones. Has been taken at Kurseong and probably occurs throughout Sikkim.

*7. *Lestes elata* Selys-Hagen.—This is the commonest of the Indian *Lestes* and occurs everywhere in wet areas throughout the plains. It should be sought for in the Duars in paddy lands and around the borders of weedy tanks. Its metallic green thoracic dorsal stripes, without the lateral projections seen in *praemorsa*, will easily determine it from all other *Lestes*.

*8. *Lestes nodalis* Selys.—There are no records of thi insect from the Darjeeling district but its occurrence in widely separated districts such as Assam and Yunnan suggest that it should occur in Sikkim and the Darjeeling district. It is a small pale brown Lestid finely peppered with black and with a bicolourous pterostigma. (We have one specimen given us by Mr. O'Donel and obtained at Hasimara Duars in the third week of June. It was identified by Lt. Col. Fraser. *Editor*.)

*9. *Lestes umbrina* Selys.—Mr. H. V. O'Donel has found it in the Duars. Its colouring suggests that it hides up in long dry grass in fairly open situations.

Genus *Ceylonolestes* Kennedy.

*10. *Ceylonolestes cyanea* (Selys).—A rather common jungle species to be sought for in scrub jungle alongside narrow shallow streams. It is a hill species and appears to be common around Kurseong, from which place Mr. Oscar Lindgren sent me a number of specimens. It is easily distinguished from other *Lestes* by its bright blue and black markings. (We found it very common at Gangtok, Sikkim, in the Residency grounds, and have also found it at Mangpu. *Editor*).

Subfamily MEGAPODAGRIINAE.

Genus *Burmargiolestes* Kennedy.

*11. *B. melanothorax* (Selys).—Has a scattered distribution in hilly tracts of Sikkim and the Darjeeling district,

and is found in similar situations to the last. In appearance it resembles a rather large and very black *Lestes*. (Our specimens were collected at Pashok in May. *Editor*.)

Subfamily PLATYSTICTINAE.

Genus *Protosticta* Selys.

*12. *P. himalaica* Laidlaw. A hill species to be sought for in dark ravines of torrential mountain streams. I found it not uncommon around Mangpu and put up specimens by getting into the bed of streams and flushing every dark crevice in rocks or beneath heavy overhanging bushes with my net. The insect is of slow jerky flight and unless driven out into the open is discerned with difficulty owing to its black colouring, relieved only by a few tiny pale blue spots. It is these moving spots which attract one's attention, the remainder of the insect being well nigh invisible in the gloom of its shelters. The falciform wings and the square pterostigma, along with its glossy black colouring will serve to determine. (We found it at Pashok in May. *Editor*.)

Genus *Drepanosticta* Laidlaw.

*13. *D. carmichaeli* Laidlaw.—A small insect shaped similarly to the last and found in similar situations around Mangpu. It differs by the bright colouring of its body, a mixture of reddish browns, olive and bright azure blue. It is common at Kalimpong and Pashok. (Our specimens are from Pashok in May and Mangpu in July. *Editor*).

(To be continued.)

More about Land Leeches.

How Abundant are They ?

BY

J. PERCY MOORE.

In an earlier paper (this Journal Vol, V No. 4) which, like the present one, was due to the kind solicitation of your energetic Editor, an account was given of some of the results of my earlier studies of the mountain land leeches while staying at Darjeeling during the autumn of 1930. Subsequently studies were conducted in other parts of India, especially at Calcutta on the Plain's species, in the Nilgiri Hills and Travancore on the species of South India and again in the region about Darjeeling from the middle of April to early August, 1931 on the several species of land leeches prevalent in this much-blest area. During this latter period much was learned of abundance, distribution, migratory movements, behavior, food, enemies, breeding and other aspects of their natural history. As my observations on the first are much at variance with current opinion this article will be devoted to that subject, largely in the hope that definite data, in the possession of others who have had much more extensive experience, may be brought out.

When, at the beginning of September, 1930, I arrived in India, with the single-minded purpose of devoting a year to the study of the land-leeches, an important part of my outfit was a complete suit of rubber, including gloves and a bather's helmit. My purpose of learning the secrets of the lives and behavior of these much discussed, but little understood creatures. necessarily forbade following the policy of avoidance that had become conventional among visitors to their domains. On the contrary the attainment of my object required that I should not only tolerate but welcome and even seek their society. It would be necessary for me to go to their favourite haunts and for long periods to sit down with them in a spirit of sweet accord. Through correspondence with English authorities on leech etiquette I had been led to believe that the proper dress for such occasions would be one of continuous armor, everywhere

impervious to their insinuating ways and leaving no unprotected heel. Hence the rubber suit. It may be stated at once that, except for the rubber shirt which served as a light raincoat, this outfit was never worn. No such complete protection against leeches was found necessary, though by the use of tight footwear and leggins and of repellents my feet and legs were effectively protected. While undeniably troublesome and at certain places, times and conditions pestiferous, land leeches proved, in my experience, to be no such general and intolereble pests as I had anticipated. Of course the degree of pestiferousness, as with mosquitoes, is largely a matter of opinion on which individuals will differ, but there is one aspect of the leech question that can be dealt with quantitatively and that is their abundance.

How abundant actually are land leeches? Any one familiar with the numerous accounts of them published by naturalists and others who have visited their jungle haunts can scarcely avoid getting an impression of abundance so extraordinary as to exceed that of almost any other kind of land animal of similar size. Such expressions as "myriad swarms", "incredible profusion", "uncountable millions", "on every grass stem and leaf", "the ground awriggle with them" and many similar are applied by scientific men to no other animals except occasionally to such extraordinary cases as the swarming of May-flies, termites, or migratory locusts. In reply to inquiries I had been informed, in letters, of places where "the ground was covered with millions of them", that "a whole field seemed to be moving", that "the very grass was squirming", that "they, yes, ten of them, were on every leaf". When, I came to India it was with the confident expectation that I should find large areas on which the leech population would approach the order of about one per square inch and this picture seemed to be confirmed when I talked with persons who had had actual experience with them. As with mosquitoes in America almost everyone knew of a particularly leech-ridden locality and many grewsome tales were heard of horses and coolies streaming with blood and of 35, 50,

100 or more leeches removed from the narrator's feet and legs after a venturesome trip along a jungle trail or cowpath.

Then I reached my first station at West Point, Darjeeling, and at once enjoyed the thrill of finding for the first time living land leeches. In suitable habitats this was not difficult for they came to welcome me literally with open-mouths. But while plentiful enough for study purposes, their numbers fell far below what had been expected. As exploration was extended and recommended localities visited the results were invariably the same. Without exception I was disappointed. Not only were leeches much less abundant than pictured but frequently they were outnumbered by certain insects, spiders and earthworms with which they were associated. First impressions were usually that leeches were more numerous than actual counts showed them to be. Many of the residents of Darjeeling averred that I had come too late (although rain continued to fall nearly every day until the middle of October) and that I should be there in June and July to see leeches in their maximum numbers.

On my second visit to Darjeeling during the following spring and summer the kind assistance of many good friends made possible the exploration of practically the entire District from the Teesta River to the Nepal border and from the Rungeet to Siliguri and the lower Balasan Valley, and also the southern portion of Sikkim. This area covers not only the principal headquarters of the land leeches, where the greatest number of species is found, but also a region notorious for their abundance, including most of the localities referred to by Dr. Hooker, Mr. Brown and others, and a large number of those represented in the collections of the Indian Museum on which the "Fauna of British India" Volume on leeches was chiefly based. Throughout the nearly four months of my second visit to the "Hills" land leeches were found in numbers varying according to species, place and circumstances but they gradually increased in numbers from April until the maximum was reached in mid-July when, in general, by actual counts they were less than

twice as numerous, except in certain favoured localities, as in early September of the preceding year.

Most of the localities infamous for leeches were visited, in some cases in company of the informant and in every instance the numbers fell below what I had been led to expect. As an example, a gentleman volunteered to show me "millions of leeches." The visit was made on a misty June morning with intermittent drizzling rain. The ground was well wetted and the vegetation dripping. Leeches were conspicuous and seemed plentiful enough. At spots of apparent maximum density counts of 3 to 8 per square foot were made with gaps of many feet where none were seen. After sauntering for an hour along about 1¼ miles of cowpaths the number of leeches counted aggregated close to 1000 and the attention of my guide was called to the fact that this was approximately 1/10 of one per cent of what his description indicated. He then said that he thought that there had been insufficient rain to bring the leeches out fully and suggested that I come again following heavy rain. This I did about 10 days later after an all-night downpour which continued during my morning visit. The average counts agreed exactly with those made before. A final visit to this spot in late July after most of the young had hatched showed a marked increase in the number of very small leeches, amounting to 3-or 4-fold on a very few especially prolific square feet, but a great reduction in the number of large leeches. Doubtless on the entire sixty odd acres of this forest grazing ground there may have been two or three millions of leeches, but this would be only about one per square foot, which is a fair average of my counts.

During the course of the investigation hundreds of measured square feet and some square yards were subjected to count, either singly or in areas up to 50 square feet, precautions being taken to reduce the error, either + or −, to a minimum. Most often counts were made at spots where leeches appeared most to abound, for if I had any bias at all it was induced by a wish to find and photograph a teeming leech population that approached my preconception of what it should be. In other cases counts were made at

regular intervals along a line drawn across a favourable portion of a grazing ground or other leech infested area. Following are some of the census figures referring to *Hæmadipsa zeylanica montivindicis*, the common grass leech of the Eastern Himalayas. The largest number counted on a single square foot was 18, except in one case where 20, mostly of newly emerged young, were taken from an area roughly plotted as a foot square on which the grass was long and there was no certainty either that all of the leeches had been counted or that none had come from abutting areas. Next come square feet yielding 14, 13, 12 and 9. On one sheep and cattle pasture the total number of leeches counted on 67 square feet selected for large numbers was 376, an average of 5·6, the range being from 1 to 13 but mostly (46 cases) either 5 or 6. On another open grazing ground where leeches were considered troublesome 120 square feet (equally divided between those selected for large numbers and those taken at random) gave a total of 213, or on average of 1·8. Many other counts on other leech infested areas yielded similar figures. In general it was found that on areas of an acre or so of grazing grounds the average would fluctuate around 2 per square foot. Along the sides of forest trails, as in Sikkim, the average ran somewhat higher. But such infested areas form a small percentage of the total land area. The leech colonies are confined to more or less limited and scattered areas. Often one may walk for several miles along a forest trail or through considerable tracts of grass lands during the rains without encountering a single leech.

After some experimentation it was found the most satisfactory method for sampling the population density of grass leeches was by means of a square frame made of four pieces of sheet iron 12 × 4 ins. hinged together with wire on the short sides so that they could be folded for ease in carrying. When in use one edge of the square frame was pressed firmly against or slightly into the sod and the hands passed rapidly over the enclosed space with two or three pats on the ground. The frame formed a barrier the crossing of which in either direction could be easily detected. All

leeches appearing within the enclosure for one minute were removed and counted, when the manipulation was repeated and the leeches, if any, appearing within a second minute counted. By the end of the second minute, observation had shown that it was safe to assume that all leeches within the enclosure, had been counted, and as the leeches on the surrounding area were gathering so rapidly as to confuse the count it was stopped. When observations on the migratory movements of marked and unmarked leeches were being made the census squares for repeated counts were marked with corner pegs. Although yard areas were sometimes used it was early learned that unless I had assistance in counting, a square yard was too large for accurate control.

My experience with *H. montana*, a bush-climbing species, was similar. I was told of places where they were on every leaf. I did sometimes find several leaves together on a twig each bearing one or two leeches and even single leaves on which as many as six leeches were congregated, but the latter were very exceptional and the leeches nearly always of the smallest size. Nearly all remaining leaves of a bush would harbour no leeches. The large leeches were widely scattered. It is easy to count leeches of this species, so that greater accuracy than with ground-dwelling species is assured. As a sample case twenty bushes, each having approximately 250 to 1,600 fully unfolded leaves, bore from 1 to 9, generally 6 or 7, leeches each. Out of many examinations made only one spot was found where the density of population of this species of leeches at all approached anticipations. This was at a cow stable where full-fed and breeding leeches had been greatly concentrated by being brought in on the cows at milking time. Many egg capsules were found under stones and in July many young were emerging. On one quite exceptional spot measuring about 6×2 feet several bush honeysuckles 2 to 3 feet high might fairly he said to be swarming with young leeches from 1/2 to 5/8 ins. long when fully extended. It was not possible to count all of the leaves or all of the very active leeches on a bush but the numbers of leeches on many leaves and the number of leaves on many

twigs gave a fair basis for an estimate that leeches occupied not more than one leaf in 6 or 8. In more cases one leech only, in many 2 to 4 and in a few 5 or 6 leeches per leaf were counted. The ratio of leeches to leaves is probably over estimated rather than otherwise in this case as the leeches were obviously concentrated on the upper and outer leaves in full view, displaying their seeking reactions. This example and many of those previously described are confirmed by photographs.

Now the question arises how is this discrepancy between published statements and the actual facts as seen by me to be explained ? Have I read into these descripitions a meaning not intended by the authors ? I think scarcely so, for no idea is more generally held among hill residents and visitors than that of the teeming abundance of land leeches. The question most frequently asked was : On what do the millions of leeches that fail to secure a meal of blood feed ? It is possible that I may have been so unfortunate as to visit India in a year of exceptional reduction of the leech population. No fact regarding animals having a short life span is better known than their numerical wax and wane from year to year. It is possible that the deficiency of rainfall that affected much of the Eastern Himalayan region during the winter of 1930-31 and to a less degree in late May and early June, 1931 may have caused an unusual mortality among land leeches. Or there may have been some other unfavourable factor. There is evidence on both sides of this question and residents of Darjeeling to whom it was put were divided in their answers. It is of course out of the question that the numerous authors and narrators who have used superlative language in describing the number of land leeches were intentionally exaggerating. Undoubtedly they were endeavouring to correctly interpret their impressions to others. But impressionistic interpretations are notoriously faulty, especially where subjective factors or preconception and personal comfort are concerned. In my own case I know that before counts were made I thought the leeches far more numerous than they proved to be. On several occasions companions were asked to glance at an area and to estimate the number of leeches before

the count was made. In every case the estimate was several times the count, although it is quite certain that the counter actually saw more leeches than the estimator. The psychology of such over estimates is obvious. The unusual (almost uncanny) appearance of the leeches, the conspicuous manner in which they wave about, their great activity, their habit of advancing toward a victim from all sides, and perhaps most of all the repugnance and even a certain degree of fear which most persons feel toward them, all tend toward augmentation of their apparent number. Almost every inexperienced person will over estimate the number of individuals in a crowd, particularly if they be in motion. Even such definite figures as the number of leeches which may be removed from one's body may be misleading as a basis of estimates of their abundance. Seventy leeches taken from one's legs seems like a great many but if one has walked along a mile of leech infested jungle trail it means only that on the average one leech has been picked up every 25 yards which does not necessarily signify any great density of population but perhaps that, because of rain or other favourable condition, the leeches are very active and one's clothing in suitable condition for penetration. Similarly if one remains quietly for ten minutes on a spot where the leech population is 2 per square foot most of the leeches within a radius of 3 ft. or more (say 50-100 sq. ft.) will have concentrated at one's feet and 35 may easily have attached to one's skin and clothing. Under such circumstances the victim is very likely to think that he has encountered an enormous number of leeches.

I am not trying to settle this question by argument, for the futility of so doing is obvious. My experience of a single season may have been quite exceptional. The purpose of this little article is to ask readers of this Journal, many of whom have had long experience with land leeches, for information and especially for any quantitative data or really careful estimates. Just how many land leeches have you seen? How generally are they distributed over large areas? How much do they vary in numbers from year to year and under what conditions? Were the seasons of 1930 and 1931 ones of reduced numbers or not?

During the course of my visit to India much generous hospitality and much helpful assistance was received from many person. This article offers a suitable opportunity for acknowledgment and thanks for courtesies received from residents of Darjeeling District, many of whom are members of the Natural History Society and among whom it is a pleasure to name especially Mr. G. E. Shaw, Mr. and Mrs. Lister, Mr. W. E. Griffith, Rev. F. Loesch S. J., Mr. and Mrs. Birch, Mr. and Mrs. F. Page Wernicke, Mr. E. G. Bee, Mr. and Mrs. S. Cox, Mr. Shebbeare, and last, but not least, your Editor, Mr. C. M. Inglis.

To

THE CURATOR,

NATURAL HISTORY MUSEUM,

Darjeeling.

DEAR SIR,

It has occurred to me that one or two happenings during a recent trip of mine in the Bhutan Terai may be of interest to some of our readers.

Effect of distant gunfire on game.

One item which was of considerable interest to me was the effect of a shot fired some ¾ of a mile away from a Panther. On the evening of February 27th a friend and I were sitting over two kills which had occurred near our Camp. The first was a large bullock tied for a Tiger and killed by a male Panther. There was a machan in readiness over this bait before the kill and B sat up at 5 o'clock. During the afternoon of the same day the mate of this Panther, the female, killed a cow just outside my tent and took it into some heavy grass. I could not see the kill and did not want to disturb it too much, so tied a goat just outside the grass. At 6 P.M. the female Panther came out and I shot it, using a ·470. At that precise moment B was aiming at the male, which was reaching out from the jungle attempting to pull the kill nearer. We were at least

three quarters of a mile apart and quite hidden from each other and yet, on the report of my rifle, the other Panther was gone in a flash and B was left looking at the place where it had been; nor did it return. Of course one concludes that that this animal had been shot at before but even then, the distance was great and rather emphasises the need for caution in shooting small game in the vicinity when camping after Tiger.

2.

I was sitting over a kill about 5 P.M. when a large Boar turned up. He stood staring at the kill and when some crows, which had seen the owner, issued a warning, the Boar merely turned his head and looked in the direction from which the Tiger eventually came. A few moments later the crows gave an even more insistent note and this time the Boar turned and trotted off, only to stand some 20 yards away and watch the Tigers, there were two, approach the kill. As I saw the two Tigers coming I naturally concluded, since both were large, that they were a pair especially as they appeared to be sparring in a friendly way, one pushing against the other and growling as they came up. After shooting them, however, I found, to my surprise, that both were full grown males, one 9 ft 4 in and the other 9 ft. measured between the blades of two kukries. Surely this was rather unusual. I wonder if I am right in presuming that they were brothers? This Boar was only one of numerous animals I saw staring curiously at a Tiger on different occasions.

3. Curiosity in Tigers.

Does a Tiger go for a tied goat out of curiosity or is it that the constant bleating annoys it? When sitting over a kill in dense grass which I did not want to disturb, I tied a goat in the open some 10 yards from the edge of the grass. At 6 P.M. a pair of Tigers came and the first walked quickly up to the goat and bowled it over, standing with its paw on the animal, which was yelling blue murder! The second Tiger immediately gave a growl and sprang on the first, rolling it over and standing on the goat in its turn. This

was a fairly big Tigress and as I fired, killing it, a third, (as it happened the Tiger,) jumped out of the grass and he and the nearly full grown cub went off together! The goat was unhurt and is the same animal that is referred to in the killing of the female Panther mentioned above. It has now been pensioned and is in my compound in Calcutta, and I have to have a man to look after it in case it gets run over by a bicycle!

4. Tusker and John Buchan.

While I was sitting up in a low and flimsy machan for a Tiger, a big bull Elephant turned up. He grazed round in the Tarapat until the movement of the bait over which I was sitting attracted his attention. I was reading John Buchan's "Blanket of the Dark" at the time and being rather scared of the Elephant and not wanting to make too much noise, I threw the book at him in the hope that he would bolt. The book opened as I threw it and fell short and the Elephant took no notice of it at all and I thought he had not seen it but a little later he walked over to it and touched it with his trunk. He immediately trumpeted shrilly and went crashing off and, from the sound, did not stop inside 300 yards! Was it the smell of the "Mosquebane", that I had on my hands, or is John Buchan's particular style anathema to the Hathi family !!

Yours faithfully,
GYLES MACKRELL.
Calcutta, 24th April 1934.

Do Animals realize when beasts of prey are not dangerous?

With regard to the previous letter from Mr. Mackrell in which he relates about a Boar standing and watching two Tigers, I asked him for further notes on other animals seen by him doing the same and for his opinion as to whether they were aware that the carnivores were not on the kill?

He has replied as follows:—"Yes, I have formed the opinion that animals are quite capable of judging whether

or not beasts of prey are dangerous or not at some particular time. The Boar to which I referred stood not more than 20 yards from the kill, on the edge of the jungle, and watched the Tigers walk out and it was my shot, when the first Tiger reached the kill, that frightened the Boar, not the proximity of the Tiger. Perhaps, had the Tigers looked in his direction, he might have behaved differently but they ignored him although they must have seen him trot away from the kill as they came up.

On another occasion I disturbed a Tiger sleeping behind a kill. I was on an Elephant. The Tiger woke up and bolted blindly, it seemed to me, into the open, changed his course and disappeared into a patch of grass. When he dashed into the grass, several Hog deer dashed out! The Tiger walked out, after waiting a few minutes in the grass, which was not extensive enough to hold him. The deer stood at gaze, and when the Tiger walked out, going away from them at an angle, they displayed no panic but still stood. Again, if he had displayed any interest in them one would not have seen them for dust! On another occasion on the Belseri river I saw a Tiger drinking at dusk and further up the river a stag and three does, on the same bank, watching from a distance of 100 yards. I was fishing and hiding by a stump and they did not see me and the stag after watching the Tiger for a full minute, walked off fairly hurriedly but the does did not follow and when the Tiger turned down stream, in my direction, and stampeded *me*, they were still staring! What, to me, is very conclusive is that on the Belseri river sands one can see fresh marks daily of Tiger, Bear, Red Dog, Mithun, Sambhar, Hog deer and Barkers galore and although it is inconceivable that these animals do not meet, and occasionally surprise each other, I have never seen any signs of stampeed in the tracks, except where two male tigers, one with a female in attendance, had met round a corner. Red dog I have seen in that area in all months of the year for the past seven years and there is no shortage of game, all kinds of deer being particularly numerous and friendly.

Kipling, (God bless him for the way he taught us all to love the jungle as boys), wrote at a time when there were few books based on really close study of the habits of animals as one really knows them and not as one expected to find them. The use of the camera has led to closer study and people now approach and watch game so much more and so I want to be absolved from any unkind criticism of the writer of the immortal Jungle Books, when I say that Kipling is largely responsible for the generally accepted idea, which Champion rightly tries to dispel, that fear, especially of the *future*, exists to any extent in the jungle. The jungle people are far wiser than the humans who run from a non-poisonous snake!"

We hope Colonel Wood and other sportsmen will give us their views and any incidents to prove them.

[*Editor.*]

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C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

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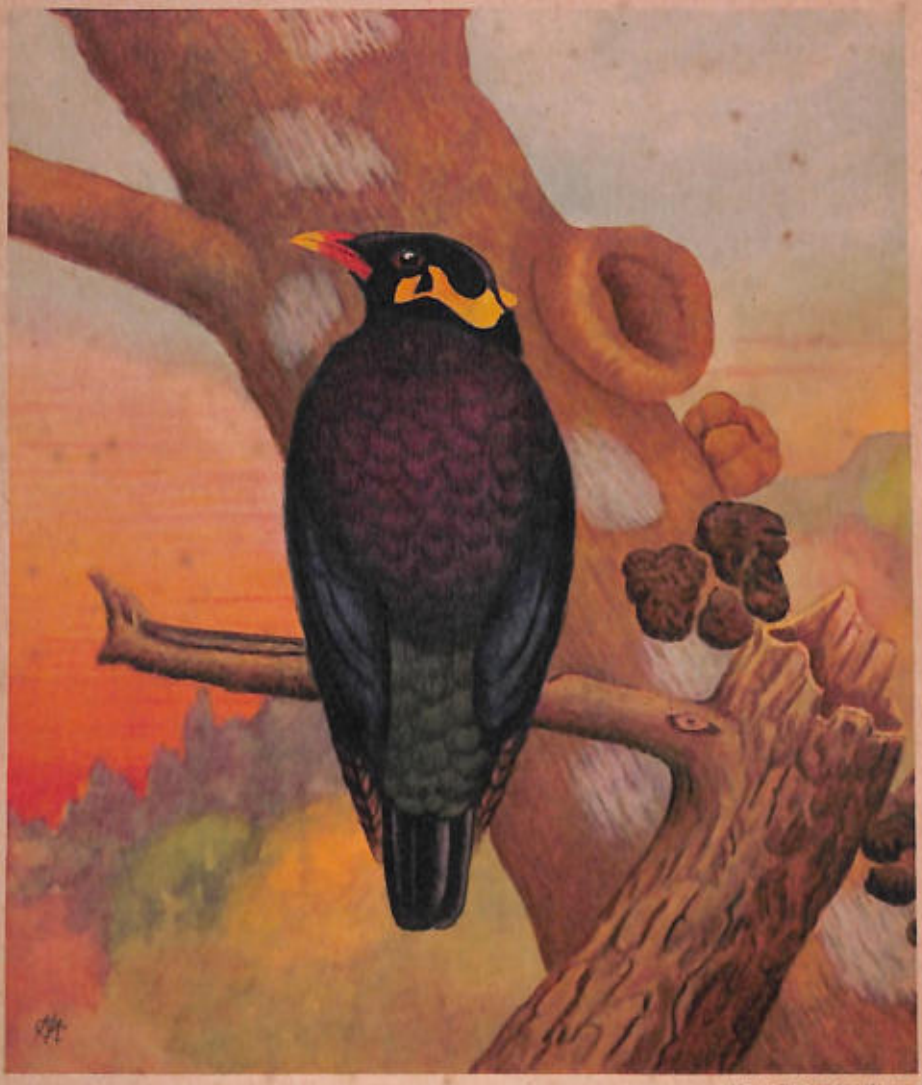
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GRACULA RELIGIOSA INTERMEDIA Hay.

The Indian Grackle.

2/5 Nat. size.

JOURNAL
OF THE
DARJEELING NATURAL HISTORY SOCIETY.

Vol. IX.—No. 4.

The Indian Grackle or Hill-Myna.

Gracula religiosa intermedia A HAY.

By
C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

(With a Coloured Plate).

We have unfortunately not been able to get ready for the press any of Col. H. S. Wood's interesting articles for this number but our next issue will see them renewed.

Editor.

glossed with purple and green, with a white patch on the wing. The most striking feature is the presence of yellow fleshy wattles on the nape with bare yellow patches of skin of various sizes and extent, absent in the Ceylon species, on the sides of the head.

In America there are some birds, belonging to the Family *Icteridæ*, which are also called Grackles. These latter birds are very omnivorous and are said to do considerable damage to the corn crops.

We will now continue about the Indian Grackle or Hill Myna.

Field identification :—A heavily built bird with short tail, larger than a Myna, glossy black plumage, very noticeable white band on wing quills and yellow wattles on the nape. Found on trees in forest or open clearings either in pairs or parties uttering, usually, harsh shrieks or croaks but also clear melodious whistles.

Description :—Length about 11½ inches ; wing 6·4 and tail 3·3 inches. The *young bird* is brownish-black and has no pendant wattles on the nape. There is no necessity to describe this well-known bird, the coloured plate is sufficient.

Distribution. In our area :—A resident bird found in the forests of the plains, even some distance from the foot-hills, and probably ascending our hills not higher than 2500 feet although, in some parts of its habitat, it ascends as high as 4000 feet.

Outside our area :—Stuart Baker gives the distribution as "The Himalayas from Kumaon to Eastern Assam and the whole of Burma, where suitable, as far South as lat. 12° ; Siam, Shan States ; Annam and Cochin China. It also occurs in the Hilly country in the South Eastern Central Provinces of India." Whistler has lately separated the birds found in the latter area as *Gracula religiosa peninsularis* on account of their smaller size and finer and shorter bills.

Habits :—The Grackle is a forest loving bird whether it is dense evergreen or thin and deciduous but it also, commonly, comes on to trees in clearings and even to those in cultivation. They are found in pairs, small flocks and sometimes in quite large numbers. They keep to trees and are said to seldom come down to the ground we, however, saw some at Chupramari freely descend to the ground in front of the bungalow. They do not walk like other Mynas when on the ground, as may be seen in an aviary, but hop like sparrows. Their notes are very variable some being melodious and others far from so. They have a rather clear melodious whistle and also hoarse croaks or very piercing shrieks. According to Davison when feeding or at rest

during the day they call and answer each other in low hoarse croaks. They are most excellent mimics and some become very proficient talkers. Their flight is direct and, for such heavily built birds, powerful. They feed principally on fruit and berries but termites and other insects are also eaten. Davison saw more than a hundred of the very closely allied Andaman race feeding on papaya (*Carica papaya*) which were growing in a clearing. He also states that numbers are caught and sold in Calcutta from three to five rupees each although, in the Andamans, they can be bought for four to eight annas each. Our species is especially popular out here as a cage bird, more so than any of the other Grackles.

In the Duars, according to O'Donel, they breed in March, April and May. Stuart Baker has occasionally got eggs in June and July in Assam so, apparently, some birds have a second brood.

They prefer old rotten trees to breed in, using the same holes, or making fresh ones in the same tree, year after year. According to Stuart Baker "In some trees one may see as many as a dozen large entrance-holes, and each has to be examined for the nest, or nests, as sometimes two, or even three, pairs of Mynas will breed in the same tree." The trees are usually so decayed that the nests cannot always be got at especially if the tree happens to be in a clearing or in cultivation widely separated from other trees. With regard to sites in which nests may be found the same naturalist says "they will breed in almost any kind of country if there are suitable trees available. I have found a nest in a rotten stump standing beside a track through the densest and dampest of evergreen forest, while I have also taken eggs from a hole in a solitary dead tree standing on a bank in a wide open area of plains rice-fields. In the North of Cachar they made their nests in holes of dead Oaks in park-land and in Dibrugarh, as well as in the Surma Valley, we often found their nest-holes in trees on the borders of Tea cultivation." The holes are generally high up in the trees, even as high as 30 to 40 feet from the ground but O'Donelhas seen a nest-hole in quite a small *Simul* tree, at Rajabhatkhawa,

and Stuart Baker has found nests as low as 15 feet from the ground. He also says "The nest hole entrances are large, neat and circular, from 4 to 6 inches in diameter, while the chamber varies. It does not seem to matter how big a natural hollow may be but, if too small, the birds enlarge it to suit their requirements generally making it 8 inches wide and up to a foot in depth.....sometimes the birds collect a lot of rubbish in the hollow such as dead leaves, grass, straw, twigs etc., upon which the eggs are laid but, at other times, they are merely deposited on the rotten wood lying at the bottom of the hole. In one nest I found nearly a bucket full of rubbish, including many feathers, had been collected, but this is quite exceptional.

"When rubbish is collected, both birds work at the collection as well as making the entrance holes and enlarging the chamber. Both sexes have also repeatedly been caught inside the tree, but whether the male was incubating or not at the time it is impossible to say, for often both birds are inside at the same time and both parents and young all roost together in the hole."

They lay two or three eggs which are bright blue in colour, this colour, however, fades rapidly, marked with a few red to deep chocolate specks, spots or blotches, sometimes very pale and faint but usually more marked at the thick end. In the richest coloured eggs there are also some lavender and pinky-grey underlying markings. Stuart Baker gives the average size as $36{\cdot}2 \times 25{\cdot}6$ mm.

This Grackle is reported to have bred in the Botanic Gardens at Sibpur, the progeny of four pairs let loose by Lady Prain in the early years of 1900.

When acclimetized the Grackles live a long time in captivity. Stuart Baker mentions one that was with its owner twenty-four years. Some young Grackles are difficult to rear especially when their wattles are growing. We quote fully from Sanyals "*Hand-Book of the Management of Animals in Captivity in Lower Bengal*" with regard to their treatment in health and sickness and transport, as it may be useful to those who keep these birds.

"*Treatment in health:—Housing.* The hill mynas do as well in small cages as in a large aviary, the advantages and disadvantages in both being well balanced. If kept in a cage, the latter should be at least three feet long, two feet broad and about the same in height, with the necessary perches, feeding and drinking cups and a bathing vessel. These birds are somewhat addicted to spilling their food, and for this, and other reasons their surroundings require constant cleaning: a thin bed of soft hay spread over the bottom of the cage, and renewed once every day, will serve to keep it tidy and clean. The cage should be placed in such a situation that the birds may have the benefit of the morning sun while protected from draughts and cold, to which they, especially the young birds, are very susceptible. Even where a large aviary is available for their accomodation, a cage should always be preferred for the location of young hill mynas, whose wattles and lappets are yet undeveloped, inasmuch as they are likely to require much careful nursing until after the growth of these processes.

Food.—Hill mynas are exclusively fruit eating birds, but in captivity they also eat satoo, boiled rice and milk, bread and milk and sundry other articles of food consumed by man; some of them have been known to become accustomed to eat boiled eggs and even minced meat; (They are not as exclusively fruit eaters as Mr. Sanyal thought as already noticed in this article. *Editor*) Where plenty of fruits, such as papya, plantains, dates, figs etc., are available, no other food seems to be required; In fact, according to Finn, once they have got their full plumage, and grown their wattles they should be fed mostly on fruit as a rich food like bread and milk and *satoo* is, to birds with such gross appetites, apt to give them fits, yearling birds in captivity require careful feeding; satoo, bread and milk should constitute their principal diet, fruit being sparingly given.

Transport.—Hill mynas kept as pets in India are not unfrequently taken to Europe by their owners; all that is required in such cases is to get a quilted cover made for the

cage and keep it inside the cabin, especially when, cold latitudes are reached. When, however, a number of them are to be transported, the best plan is to put them in a snug plank cage well covered with felt and having proper arrangements to admit hot water at the bottom. These birds have never bred in this, or, so far as is known, in any other garden.

Treatment in sickness.—A certain affection of the eye akin to *opthalmia* is most common among these birds in captivity; it either effects one or both the eyes, and is generally caused by exposure and cold, although unsuitable dieting may also have much to do with it. If the patient happens to be living in an aviary, it should at once be removed to a small cage, so as to admit of its being handled for treatment. The eyes should be gently washed with sulphate of zinc lotion (sulphate of zinc 1 grain, and water 1 ounce) twice daily, and the bird kept in a warm place, the cage being covered up with a piece of linen or, if the weather is cold, with a blanket; mild cases will yield to this treatment within two or three days. It generally, however, assumes a severer form before any notice is taken and proper treatment adopted; the eyes and the surrounding parts become swollen, the eyelids tumefied and closed, and the conjunctiva completely covered with thickened and hardened discharge. As it cannot but be very painful to the patient, before any attempt at cleaning the eyes and surrounding parts is made, poppy-head fomentation should be applied with a sponge for about a quarter of an hour; the eye-lids should then be gently opened, the thickened and hardened matter adhering thereto and to the conjunctiva removed, and the solution of sulphate of zinc applied with the tip of a feather; on the second day the discharge will be less and the swelling much reduced, and in two or three days the patient will probably recover; a dose of castor-oil, twenty to thirty drops, in a little milk, should be given internally at the beginning; the diet should be light and nourishing, such as bread and milk, satoo prepared with ghi and eggs, etc., no fruits, especially plantains and papya, are to be allowed. Mynas also suffer from other ailments

incidental to a captive life. Another disease to which only the young birds become subject appears to have some close connection with the growth of their wattles and the lappets, as it commonly shows itself during the period while those processes are in the act of growing. It consists of a tumour or an abscess near to or on some part of the wattles; by way of treatment a poultice made of burnt turmeric *Curcuma longa* is generally applied by the bird-fanciers of Lower Bengal, and almost invariably with good results; as the young bird shows great aversion to food while suffering from this malady, it requires to be hand-fed; it is needless to say that the bird should be kept warm, and the cleanliness of the cage thoroughly attended to. It may be mentioned here that when a tumour or an abscess is well pronounced, it is by far the best to lance it."

Besides being kept in confinement Grackles may be given full liberty and become extraordinary tame and attached to their owner.

With regard to their ability to talk, as Finn says, real good talkers are rather rare "although accomplished coughers, spitters, etc., are only too common!" He tells of one bird "whose favourite remark was "Not a drop to save my soul!" uttered with an unctuous fervour which ought to have been worth pounds to a Home for Inebriates." We have heard others say "Shut up you dirty dog" and "Oh! you *soor*!" they are also very quick at picking up the names of people and dogs and imitate the notes of other birds. One can see them listening to one, often with their heads cocked to one side.

A friend of mine, who is exceptionally good with animals and birds, has sent me some most interesting notes about her Grackle named Maurice. I give her letter *in extenso* "Yesterday, when we were taking our evening walk, a black rat, three or four inches long, exclusive of the tail, ran across the path in front of me. I stopped to watch it and Boojum the dog, and Maurice the myna who was sitting on a stick in my hand, immediately gave chase. The creature took refuge under some big stones on the side of the road, but Maurice found a small hole into which he poked

his head following it with nearly the whole of his person. I heard the rat squealing, I imagined with rage, and feared it would seize Maurice by the throat and kill him. I ran forward to try and pull him out of the hole, but before I could get to him he emerged triumphant holding the rat in his beak by the end of its nose ! The rat was squealing in terror. It must have weighed quite three or four ounces but Maurice flew off with it and we heard its squeals dying away in the distance. Finally they disappeared round the side of the hill, but in a few minutes Maurice came back without the rat but very breathless from his exertions. I examined him but there was no sign that the rat had bitten him. He always goes for lizards, big and small, and those stick insects, but a rat.....!" This is most extraordinary behaviour for a Grackle, and it is surprising that it was able to lift and carry away such a heavy object as this rat. On asking for further anecdotes or notes about Maurice my friend has most kindly sent me the following observations. "I think the two things about him which strike me most are the way he likes to sleep lying down instead of perching, and his joy in flight.

"He will go into a cupboard or book case and lie down on a shelf, or will creep under the overhang of my roll top desk (under the pigeon holes) when I am working at it, and lie down there and sleep. But however soundly he appears to be sleeping and however quietly I may move, he is up and after me the moment I leave the room. Ever since he has been able to fly he has always left his perch at dusk and put himself to bed in my lap. He snuggles down quite flat and sleeps there till the cage, in which he spends the night, is brought and I put him into that. If I dare to move or disturb him when he is in my lap he gives a little fractious cry just like a sleepy child.....a cry he gives at no other time. In his cage he has a box with cushion in it, and he always gets into it at once, lies down and remains there all night. I often find him still there in the morning, once he went off a long distance to a friend's house on his own, she shut him up in her godown for the night but had to hunt out an empty box for him to go to bed in because he would insist

on trying to make a bed for himself in a half empty box of quaker oats or something of the sort.

" This evident joy in flight interests me because it would seem to give the lie to the statement so often made that birds fly, not for the joy of it, but simply in order to get their food. Cage them, and feed them well, and they will have no desire to fly. This is most certainly not true of Maurice. There can be no doubt at all that he flies for the sheer joy of it. Some days when we go for a walk he is in flight practically the whole time. No sooner is he back on the perch I carry for him, or on one of our heads (a favourite alighting place) than he is off again. He races with Boojum, skimming along the path just out of his reach, then flings himself up in the air and wheels and circles about like a mad thing. And the myna is not a bird that suggests flight with its heavy body. It took him about a year to get full control of himself in flight. Now he can thread his way through closely growing trees to get to me and never touch a branch.

"The longest flight I ever saw him take was one day when he went right across the Balasun and the hills on the other side and must have crossed the Mechi and reached Nepal. It was a most beautiful sight. He flew in great circles getting higher and higher and further and further away, till I completely lost sight of him and my husband could only just see him as a speck against the sky. Then he turned and came sweeping and circling back again till finally he planed down on to my *topi*. Next morning he disappeared quite early and did not return for 24 hours and we always think he went off to complete his explorations. It was a terribly stormy night and he arrived drenched to the skin and has never gone away since. I expect he had a bit too much.

" Occasionally other mynas of his *jat* come here but he never seems the least interested in them although he tries to make friends with a pair of house mynas that are always here. They play together a lot chasing each other all over the place, sometimes Maurice after them, sometimes they

after him—a sort of friendly armed neutrality. He sleeps with them in the roof sometimes. They drive him away till they get sleepy and then he, occasionally, goes in to them, but usually he has fled to me for protection before this happens.

"He is rather nervous at first with strangers, but once he knows any one he never seems to forget them however long it is till he sees them again so, evidently, he has a good memory."

With regard to this bird's diet my friend writes:—" He does not eat meat but apart from that is practically omnivorous. He was not so at first, but inclined to be suspicious of any new thing that I offered him. Now, however, he eats or tries to eat whatever he sees me eating. What he loves more than anything is butter and next to that hot buttered scones and tea cake. If he sees the tea cake dish on the table at tea time it is no use offering him cake or bread and butter. He simply takes it and drops it until he gets tea cake! He used to eat dry bread.....brown.....never cared much for white, but one day I gave it to him buttered and now he will only eat dry bread if he is *very* hungry. When Boojum has his breakfast which is dry dog biscuit of various kinds, Maurice always steals two or three bits and swallows them without apparently any subsequent discomfort, though it is not exactly the sort of fare one would think would suit a fruit eating bird! He also eats Spring onions with avidity, but not always. Some days he refuses them, and on others will eat nine or ten at a go and refuse anything else if he sees them on the table. It is as if he had a craving for them from time to time. He gets three small tea spoonfuls of *sutoo* mixed with water to a paste everyday, and some banana, but for the rest shares my food."

I've had further news of Maurice while *ex-route* for home. My friend writes:—"Maurice proves an *excellent* traveller. He takes everything as it comes and gives no trouble. Directly we got into the train on Monday I took him out of his small cage (on the leash of course) and let him sit on his stand which he did quite happily till his bed

time, when, of his own volition, he got into my bed (which was made up), lay down beside me and never moved all night! It was cold, and I pulled up blanket after blanket as the night wore on and wondered if he would be suffocated; but he evidently approved, for he did not move until he heard the rattle of the tea cups with our early morning tea, quite an hour after his usual getting up time. He then instantly emerged, very spry and very hungry. It was the same again last night, so I take it the problem of keeping him warm at night is solved!"

Elwes' Eared-Pheasant (*Crossoptilon harmani* Elwes) in Captivity. Its daily round of life and notes on the species.

By

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

(With a Drawing and a Plan).

A pair of these birds was received by Major F. M. Bailey, C.I.E., (now Lt. Col.) from Tibet on the 4th June 1924. They passed through Changu (12,600 ft.) in Sikkim while Capt. Nevill and myself were there but we did not see them then as they went right through. However, on my return to the Residency at Gangtok, I was fortunately able to spend a whole day observing them.

These birds are exceedingly rare, even in Museums, and no others had ever been kept in captivity so it was a unique opportunity of observing them, one not to be lost.

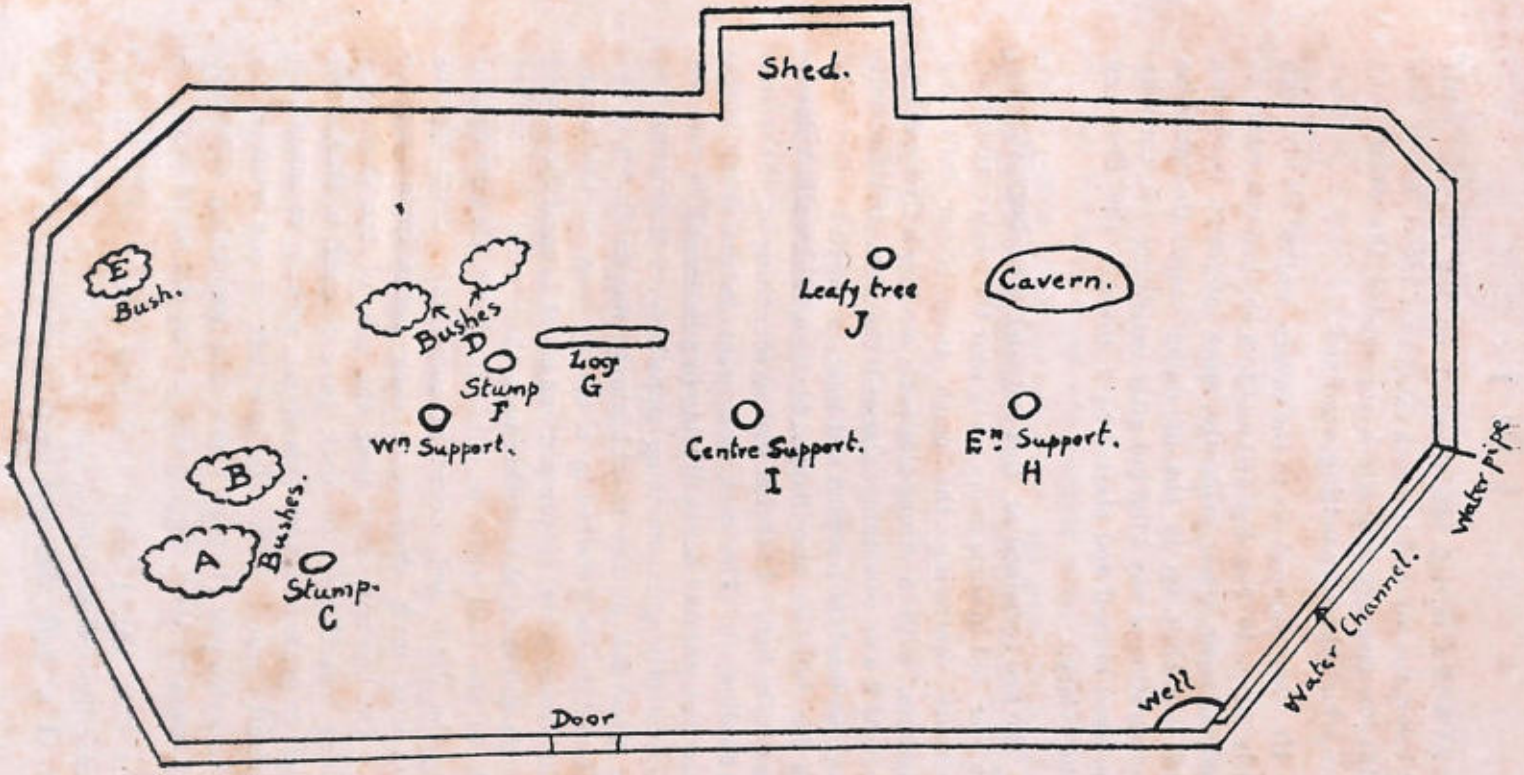
They were housed in the same fine aviary which held the Blood-Pheasants (*Ithaginis cruentus*), an account of which appeared in *Vol. V. No. 3 pp. 53-61* of this Journal. The other wild inmates being four Spotted Doves, one male Himalayan Greenfinch and, in the evenings, a pair of Demoiselle Cranes. There were also a pair of Guinea fowl and a couple of coops of chickens.

I visited the aviary at 4-30 a. m. and found both birds roosting on the bush under which the hen Blood-Pheasant was sitting on eggs, but five minutes later the cock got down on to the mat, which was placed to shelter the Blood-Pheasant from rain and hail, scratched his head, pecked at his breast and opened his wings ; eight minutes later he walked down the mat and flew on to the ground and was there joined by his mate a few minutes later.

They slowly crossed to the East side of the aviary, grazing as they went and while in her company the cock made a low soft call something like *oway ! oway !* and she ran up to him and picked up some delicacy.



ELWES' EARED PHEASANT (*CROSSOPTILON HARMANI*)
DRAWN FROM LIFE.



Ground Plan of Aviary.

At 4 45 a. m. the hen drank from the running water just below the tap and the cock caught an insect which was on the low masonry wall which surrounded the aviary and above which the wire netting was fixed.

He then jumped on to the cavern, walked slowly, with stately step, to the log (G) and to a chicken run where he remained some time, evidently, much interested in the hen which was shut up in the adjoining coop. He made no demonstration of any kind but after satisfying his curiosity he preened himself and started back towards the East end of the aviary.

The hen remained at this end and was busy digging, with her bill in some damp earth near the water reservoir, sometimes scattering the earth towards her belly and sometimes, with a strong side peck, sending it flying to one side. At 5 a m. something alarmed the cock but he only raised his head for a second and went on digging vigorously with his bill, he also flapped his wings and walked slowly towards the hen. I saw her pick at something on the water and swallow it. The cock now went to the damp earth where she was and began digging in a business-like manner and evidently got something appetising. Meanwhile the hen proceeded in the usual leisurely way to the top of the drain and the cock walked in a stately way to the centre of the aviary where he preened and shook himself for several minutes and then, at a quicker pace than usual, he walked back to the wall where he joined the hen. He now walked along the drain and picked at something. Some pigeons flying over made them crane their necks for a second or two. The hen now stood near the side of the drain and preened herself and the cock gave himself a shake and started to graze and turn over stones, picking at something, apparently insect food. He now left her and went across to the centre post (1) near which was something attractive as he remained there digging and picking for sometime.

At 5-30 A.M. I heard him utter a call which, to me, sounded like *wough, wough* and reminded me of the sharp bark of a dog! this was again uttered several times some

ten minutes later and on both occasions from the ground and with no extension of the neck.

The hen was still at the Eastern side and. on several occasions, I saw her feeding at the same spot as a hen Blood-Pheasant.

The cock had now reached the North-West end of the aviary and was very busy digging all round himself and feeding; sometimes digging close to his breast, and, at other times, rather well away from himself.

The hen meanwhile was digging away and dug up several worms which she swallowed with great relish. Five minutes later she seemed to have exhausted this spot and went further East.

The cock had crossed the aviary, stopping to pick at grass as he went but not digging, to near the cavern where there was a chicken run; this, or rather the enclosed hen, seemed to be some attraction to him; he peered through the wire netting, up and down, at the hutch to see if there was any means of ingrees. He remained here some time, often with his head close up to the netting, but, at last, finding he could not get in, got tired of hanging around, picked at some chicken food which had dropped, stretching one leg at the same time and partially uplifting one wing and went past cavern cropping grass as he went. He jumped on to one of the stones of the cavern and stood there apparently gazing at nothing.

The hen was still at the west side of the aviary, near the lower bushes (A), occasionally picking up something. She flapped her wings, shook herself and proceeded towards the bush (E) where the Blood-Pheasant sits. The cock, in the mean time, had also come West and at 7-20 A.M. they were both together at the North-Western corner. He got on to a low masonry wall and preened himself and she did the same, near the bush; now and then he stood motionless. A pair of young Doves came and sat a few inches away from him, not in the least afraid, looked up at him examplifying Dignity and Impudence. He now drew up one leg and

rested on the other one and the hen, having finished her toilette, remained motionless a couple of yards away. They stayed like this for some time and, at 7-45 A.M., the cock dropped his tucked up leg and stepped off the wall and began to feed. Five minutes later he stretched himself and walked in a slow, dignified manner further East.

The hen was now busy digging in the South-West side, mostly with side blows of the hill; she stopped for a bit, drew up one leg, only hiding the shank in the feathers, and began preening herself. She then remained motionless for a short while turned round and began preening again.

The cock gave a flap or two of the wings, jumping in the air at the same time, turned in her direction; got on to the wall and preened himself. He then returned to their favourite North-West corner and the hen, after remaining twenty minutes in one position, joined him there, where he was picking at grass and digging with his bill. He appeared to be feeding on succulent roots. They stopped to preen themselves for a bit and then went on feeding again. They were momentarily startled by the guinea-fowl screeching and, at intervals, preened themselves, often standing on one leg while doing so.

The cock called quite close to me at 8-30 A.M. Standing on the ground he raised his head and called *uh uh, uh uh, uh uh uh uh*, the first two notes not so quickly uttered as the others which are uttered very quickly. The call is very difficult to syllabalize and is very harsh.

Both birds remained at this side of the aviary till 10-25 A.M. the cock then stepping across in the usual stately fashion to near the cavern without stopping to feed on the way. The hen remained at the West side walking up and down it with deliberate step, every now and then stopping to pick at something, she made several halts but her motions were very restless.

The cock was busy picking young and tender grass at the East end of the aviary but didn't remain there long. He traversed the North side of the aviary passing through

the shed. I was close by and he didn't like to pass near me but, at last, picked up sufficient courage to do so uttering a low soft note, which I syllabalized as *oway oway*, as he went by. He stopped to pick something and at 10-45 A.M. again joined the hen at their favourite corner which is now well dug up.

The hen was engaged in spade work with her bill and the cock preened himself, after which they both picked about for a bit; he now got on to the wall and preened himself again, she doing likewise but on the ground.

A dog squealing made them raise their heads for a moment, but otherwise didn't disturb them, and they resumed their toilette. The hen gave herself a shake, picked at something, then squatted on the wall and continued preening herself.

At 11-15 A.M. the cock slipped once, righted himself by partially expanding his wings and stepped down. He grazed for a moment or two, preened himself again and went towards the bush, where the Blood Pheasant sits, grazing on the way. He then squatted in the ferns, picked something off a leaf but I could only see his head. A quarter of an hour later he got up, stretched one leg and wing, and began feeding in a dilatory manner; he then scratched his head and preened himself as did the hen.

A dove flying close overhead startled them and they jumped to one side, bending forward and spreading their tails at the same time; the cock then stretched himself and both began preening operations again. They then both started digging with their bills and picking about, the hen once stopping to shake herself and ruffle her feathers. The cock squatted in the ferns for five minutes and then got up and grazed towards the Blood-Pheasants bush, stopping once to flap his wings and spread his tail, standing upright while doing so; the hen did the same.

Again a dove flew past and the cock jumped in the air spreading his wings and tail. Both now proceeded to their favourite digging spot and dug and fed close together. At

noon they stopped feeding and went behind the Blood-Pheasant's bush for a moment or two ; the cock then preened himself and the hen paced up and down trying to get out. A quarter of an hour later he crossed over the centre of the aviary and was most assiduous in digging and picking up insects which I think were ants. Now and again he would give a fierce sidewards dig with his bill sending the earth flying to one side. A man now entered the aviary and he scuttled past at a great pace, with outstretched neck held high, to the East side of the cavern where he dug vigorously for a few minutes, then ran quickly across to where the hen was on the West side, near the Blood-Pheasants bush ; they now rested, he on the wall and she on the ground and preened themselves ; his preening only lasted a few minutes and he got up and walked up and down along the wall.

At 12-55 P.M. the hen flew on to the mat, preened herself, cleaned her bill on it and flew down to between bushes (A and B) where she was joined for a minute by her mate. She squatted between the two bushes and preened herself and he grazed back again towards the wall but returned to the shade of a bush beside the hen.

On returning after lunch at 2 P.M. they were both in their favourite corner, the cock preening himself on the wall and the hen doing the same on the ground. Twenty minutes later he got down, pecked at some grass, near the Blood-Pheasant's enclosure, gave his head and body a good shake and preened himself again and then picked at something.

At 2-35 P.M. the hen got up walked slowly past the enclosure, picking at grass as she want, shook herself and grazed toward bush (A) where she stood for a little preening herself and was joined here by the cock fifteen minutes later ; both then returned to their favourite corner ; he to his old station on the wall and she on the ground near him : here they again preened themselves.

At 3 p.m. he got down picked at something on the wall and preened himself. She doing likewise and a few minutes later both rested. Then they began to feed, but

with little enthusiasm, and he returned to the wall where he scratched his head and preened himself. Five minutes later he got down to pick at something but she remained squatting. Shortly afterwards both began digging, working their heads from side to side and occasionally looking up. They were now most assiduous in their search for food, moving forward very slowly and working each inch of ground most thoroughly.

At 3-30 p.m. the cock stopped feeding and walked along the wall towards the shed, stopping and looking about now and again. When near the chicken run he got down and began making that soft low sound heard in the morning; he opened his wings once and stretched himself nearly overbalancing while doing so. Then he walked over to the cavern feeding once or twice on the way.

The hen was still busy feeding at their favourite place pecking and digging backwards and forwards over a very small area. By 3-45 p. m. the cock had reached the Eastern wall. It had been raining some time so he shook the drops off his feathers and returned to the chicken run uttering his soft, low note ; here he ensconsed himself beneath a piece of bamboo matting but only for a short time ; now he ran across in front of the shed, to where his mate had been digging and started feeding there. She had stopped feeding and was standing quietly on the wall. He joined her there and preened himself.

At 4-20 p.m., the cock moved across to the ferns, picking at grass on the way, but the hen still remained motionless with puffed-out feathers and looked very dejected. Twenty minutes later both were busy digging and feeding, he uttering his rather pleasant low note *oway, oway* ; he continued uttering it near the chicken run and now and then trying to reach the enclosed hen, sometimes standing up at full height, with expanded tail, when attempting to do so. He walked round and round the run in a crouching manner, every now and then extending his neck, the tail being expanded the whole time, each feather separated. He jumped at the hen sometimes striking at her with his feet

in the same way as a cock does. While jumping up the wings were expanded and he kept up a low soft note resembling *wha ! wha !* the whole time. Several times he jumped on to the run and nearly overbalanced himself, but by raising the expanded tail was able to right himself again. Though, apparently, unfriendly towards the hen, he was quite friendly with the guinea-fowl and other inmates of the aviary.

At 4-50 p.m. he entered the shed and drank five times out of the porcelain vessel which contained water, after which he walked a few yards beyond the shed but returned to it again and picked about in some charcoal but swallowed none ; he however discovered a piece of egg-shell which he swallowed and then went to their favourite digging ground where he ate one or two small seeds.

The hen was moping where she was last noticed but joined her mate at 5 p.m., and they both began feeding at their favourite spot. He then got on to the wall, looked around a bit and cleaned his bill against it. The hen only fed for a few minutes, stopping to preen herself, as did the cock, he also scratched his head. The hen began feeding again and shaking herself between courses.

At 5-30 p.m. the cock got down, after having been exactly half an hour on the wall, fed for a few minutes and returned to the wall again getting down five minutes later to feed again. They remained at this side of the aviary for more than half an hour.

I once saw the cock use his feet. He was digging away with his bill in the usual fashion and then gave a couple of scratches with his feet ; that was the only instance during the whole day that this occured. Beebe in his Monograph says :—"The Eared Pheasants like the Impeyans, probably never use their feet for scratching, the heavy body and short legs doubtless making the quick shifting of gravity not an easy matter". The sole occasion noticed by me is the exception that proves the rule.

The cock then, with slow and stately tread, crossed to the East end for a few minutes, returning to the other side

where his mate was ; he stood upright and opened his wings and once while grazing he looked into the air and pecked at something on a leaf. Some people entering the aviary disturbed him but he only increased his pace a little for a short distance and again assumed his slow and stately step. He then raised his head as somebody passed outside, stretched a leg and went into some ferns. When standing the tail droops but when walking it is slightly raised.

At 6-30 P.M. they both got together for a minute or two, then separated, the hen digging for a bit and preening and shaking herself. Again they got together, the cock looked around in the air and the hen pecked at something. Five minutes later they looked up into a bamboo clump outside the aviary as if they wanted to roost there, getting on to the wall to be as near to it as possible and paced up and down the wall trying to get out. At 6-40 P.M., the cock flew on to the matting, which protects the hen Blood-Pheasant but got down again, rather clumsily, stepping on to a bamboo, the wings and tail slightly expanded, and from there jumped to the ground. They again both looked longingly at the bamboo clump, paced the wall for a bit craning their heads towards the clump. The hen jumped on to a small stump and looked towards the bamboos. The cock, for the second time, jumped on to the matting and craned wistfully towards the bamboos again returning to the ground in the same manner as before. A few minutes later he again flew on to the mat, looked up at the clump and jumped down again. Both now paced about for a little, every now and then looking towards the bamboos. Th cock flew on to the mat, for the fourth time, and back to the ground again.

The hen stayed under a bush for a minute or two and then joined her mate both looking for some time at the clump of bamboos. The cock, for the fifth time, got on to the mat and at 6-50 P.M., went into the bush near it, remaining there to roost. At the same time the hen attempted to fly up into the bamboos but, of course, was stopped by the wire netting. She was now very impatient to roost and, five minutes later, she flew on to the mat and from there to the bush, but found her footing not very secure

and, after floundering about for a bit, she had to return to the mat ; she, however, only waited there a minute or two returning to the bush, where she had to use her wings to balance herself at first ; by 7 P.M., she also had settled down for the night. Other birds of this species received by Bailey preferred roosting high up on a dead tree.

Bailey told me that these Pheasants, in a wild state, are very noisy in the early morning and less so in the evening. He also said that the call I heard was not the same as he heard uttered by wild birds nor does he consider the call resemble that of a Peafowl as given for the allied species the Blue or Pallas' Eared-Pheasant (*Crossoptilon auritum*) in Beebe's Monograph. He also told me, later on, that he heard his birds calling in the early morning in mid-February but that, when he wrote, they were calling at any time during the day ; while some blasting operations were going on they called to the report. I have heard the cock calling from a pile of rocks and from a stump. The hen is less vociferous than the cock.

Prjzwalsky, as quoted by Beebe, writing about the Blue Eared-Pheasant (*Crossoptilon auritum*) says :—"The great difficulty lies in discovering the whereabouts of the bird, owing to the long irregular intervals between its cries, whilst it is sometimes absolutely silent even on a fine bright morning." This agrees with what I observed as to the silence of these birds.

Although Beebe writes about *Crossoptilon auritum* that "several observers have spoken of the enjoyment which these birds seemto take in dust baths" during my whole days' observations, of this very closely allied species, I never saw either of them dust themselves.

As regards the manner of feeding my observations corresponded with those of Beebe when writing about the Brown Eared-Pheasant (*Crossoptilon mantchuricum*). I found the greater proportion of food to be vegetable ; they were fond of cropping grass and eating the succulent roots of plants and also seeds. They ate cauliflower leaves but were not as fond of them as were the Blood-Pheasants. I

also saw them take insects. They ate paddy in preference to maize, unlike most of the other Pheasants in the aviary.

During a second visit to Gangtok, when Bailey had four males and two females of these Pheasants, the birds were rather sluggish, often remaining in one position for half an hour or more though, certainly, when walking about, although their gait was slow and dignified, they assumed an alert manner. The apparent sluggishness may have been due to their being brought down from a high elevation (10,000 to 15,000 feet) to the comparative low one of Gangtok (5,900 feet).

One of the Eared-Pheasants had to be kept shut up as he was very pugnacious. He killed a Blood-Pheasant by bashing its head in with his powerful bill and also nearly killed a cock Monal. He was the tamest of the *Crossoptilons* and would jump on to Bailey's knee to be fed. Bailey noticed it displaying before a hen Monal about the end of November and I also saw one displaying; one wing was lowered and the other raised. The bird assuming a slanting position, the tail was spread laterally each feather separated. The cock, while chasing a hen, opened his wings, spread his tail and lowered his head.

Note on the species.

In the Eared-Pheasants the top of the head has short velvety feathers and the ear-coverts project beyond the head in upward-curved tufts. The plumage is long, lax and hair-like especially so in the centre tail feathers, the webs of which fall in handsome curves over the much shorter and closer plumed outer feathers.

Beebe considers this bird to be a hybrid between Pallas' Eared-Pheasant (*Crossoptilon auritum*) and the Tibetan White Eared-Pheasant (*Crossoptilon tibetanum*). It has also been placed as a subpecies of *auritum* and Rothschild considers it to be a subspecies of *Crossoptilon crossoptilon* (*tibetanum*), but at present the material is too poor to enable any definite status to be given to it. Stuart Baker, for the present, retains it as a full species.

In colour it greatly resembles *auritum*. Elwes' original description and note in the "Ibis" for. 1881 as given by Beebe, is as follows :—

"*Crossoptilon harmani*, sp. nov. (Plate XIII). "Bill horn-colour tinged with red, 1½ inch long from gape, and ¾ inch deep at nostril. Lores and a space surrounding the eye, 2 inches long by 1 inch deep, naked, red. Top of head covered with short velvety blue-black feathers. A band on occiput, chin, and middle of throat, for a space of about 5 inches from the beak, white. Ear-coverts produced, nearly 2 inches long, white. Rest of neck, back, wing-coverts, breast, flanks, and under tail-coverts dark slaty bluish. Upper tail-coverts long, rather greyer than back. Centre of belly white. Primaries and secondaries dark slaty bluish, with purplish reflections. Wing 12 inches long. Tail composed of twenty graduated feathers, the central pair about 18 inches long, the lateral pair about 9 inches, bluish purple, with violet and green reflections on the central four or five pairs. Tarsi strong, 4 inches long with stout spurs. Middle toe, with claw, 3 inches long. Legs and feet vermillon red.

Hab.—Eastern Tibet, about 150 miles East of Lhasa (*Harman*).

"This species resembles the figure of *C. auritum* Pall., given in Elliot's "Phasianidae" in its general coloration and markings. It may, however, be easily distinguished by the tail—which has no white in the centre of the lateral feathers, and is quite differently coloured. The type of *C. auritum*, according to Elliot, is lost ; it is, however, described by Pallas as having eighteen tail-feathers. Mr. Elliot's plate is taken from specimens collected by the Abbé Armand David in the provinces of Shensi and Kokonor, and originally described as *C. caerulescens* David ('Comptes Rendus,' lxx. p. 538, 1870). The figure shows twenty tail-feathers, as in the case with my bird ; but whether the species collected by David is really *C. auritum* Pall, or not, my bird is clearly distinct from both of them, so far as can be ascertained without seeing the specimens themselves.

"For this fine species I am indebted to Lieut. Harman, R. E., who has distinguished himself as a surveyor and explorer of the Eastern Himalayas, especially in Sikkim, where he has been employed for some years. When at Darjeeling in December last, I saw the skin of what I at once recognized as a new *Crossoptilon* hanging on the wall of his room. Unfortunately it had never been properly preserved, and was in such a terribly moth-eaten state that the remains, which he kindly presented to me, and which are now in the British Museum, are hardly worth preserving. They have, however, proved sufficient for Mr. Keulemans to make a very accurate drawing, the only fault of which is that the ear-coverts do not seem in the specimen to be so strongly developed as in the figure.

"The skin was brought to Mr. Harman by one of his native surveyors, who said that he had procured it 150 miles east of Lhasa, at an elevation of about 6000 feet, where it was found in flocks during winter. This part of Tibet has never been visited by any European or by any of the late Mr. Mandelli's native hunters, and having, as reported, a much milder climate and more luxuriant vegetation than the western parts of Tibet, may be expected to produce a number of remarkable and, as yet, unknown species.

"This makes the fifth, or, if *C. tibetanum* Hodgs., and *C. drouyni* Verr. should prove to be identical, the fourth species of the genus known ; and though it is probable that, as in the genus *Phasianus*, the local races or species of *Crossoptilon* will be eventually found to merge insensibly into each other, yet there is no difficulty in distinguishing them so far as we know at present."

I have two skins of Elwes' Eared-Pheasant, in my private collection of Game birds, which I owe to the generosity of Lt. Col. Bailey. They were both obtained at Shingdzam in Tibet at an elevation between 12 and 13,000 feet ; the cock on the 7th April 1922 and the hen on the 15th of the same month. The tail of my hen specimen is not complete but that of the cock has twenty feathers as given in Elwes' description.

My specimens differ slightly from the original description. The feathers on the top of the head are more a velvety violet-black than blue-black; the neck and extreme breast is *much* darker than the rest of the body plumage and in certain lights shows a violet gloss; the rump and upper tail-coverts are very light glistening ashy-grey, the coverts tinged with cream, strongly contrasting with the rest of the upper plumage and not only "rather greyer than back" of the original description. The primaries are unglossed brown; the tail feathers are as in the original description, the centre ones metallic purple at the base changing to bronze-green and then rich bluish—purple at the terminal 4 or 5 inches; the flanks are pale ashy-grey and the thighs brown.

In the live bird I noted the soft parts as :—Bill yellowish-fleshy, cere lighter; facial skin deep lake; legs light pinkish-lake and iris orange-red.

Bailey gives the colours of the soft pacts as :—"iris orange-brown; bill light reddish-horny; legs scarlet.

He gives the length of a large cock and a large hen as 35¼ inches and 34⅛ inches. The spurs in my bird are ¾ inch.

The sexes are alike the hen differing in having no spurs. Stuart Baker describes the chick obtained by Col. Bailey as follows :—

Chick.—Probably about a fortnight old. Crown velvety black and not brown as in Pallas' Pheasant; upper plumage a dull black changing to dark ashy grey on the rump and upper tail coverts; the shoulders and wings are vermiculated with reddish bars and the wings-coverts have broad reddish fulvous shaft streaks. The distribution of the white on the head is the same as in the adult, and the long ear-tufts are partially developed, but the white does not extend down to the throat; there is a well defined black patch behind and under the ear coverts.

"The upper breast and flanks have the feethers black with the centres and terminal edges fulvous; the lower breast and abdomen are dirty white; the vent and under

tail-coverts dull ashy grey with white tips, and the tail feathers are blue-black glossed with blue, which has a tinge of green in certain tights."

He gives the distribution as :—"Abor and Mishni Hills and South-East Tibet. Apparently common on all the higher ranges of the extreme North-Eastern watershed of the Brahmapootra River."

Bailey got a clutch of 6 eggs from Lhagyari in Tibet at an elevation of from 12 to 13,000 feet on the 12th July 1933. Three out of four, which I was able to examine, were buffy-stone colour with, in two of them, pale brown specks and freckles towards the narrow end, the fourth egg was not so buff but a clearer greyish-green. They measured 59 × 43, 59 × 42, 58 × 42 and 60 × 43 mm.

Bailey seems to be the only white man who has observed this fine Pheasant in a wild state. He writes to the Bombay National History Society —"This bird occurs in Pome, where I found feathers and scratchings, though I was never fortunate enough to come on the birds themselves. It is common in the Lower Tsangpo Valley in Tibet. The furthest point west at which we saw it was the East side, Putrang La, when there were numbers in the rhododendron scrub at about 15,500 feet. The lowest elevation at which we found this pheasant in the Tsangpo Valley was about 9,300 feet at Gyala, but I saw traces of them in Pome at about 8,500 feet. In the valley of the Tsangpo itself the highest point upstream at which we found these birds was the neighbourhood of Nang Dzong. They were plentiful in the valley of the Char, which is a branch of the Subansiri but more were found west of the Pu La, which is the watershed between the Tsang Po and Subansiri in this region. There were many on the Takarla and the Le La. They were heard calling near Natrampa on the Lower Chayul Valley, but they do not appear to extend west of these places. They were said to be common at Tsari in winter, but we saw none. These birds move about in flocks of about 5 or 10 and freqnent forest covered hills and the higher elevations, dwarf rhododendron jungle, where they

feed on the grassy clearings among the bushes. They are only noisy in the early mornings, and less so in the evening. Their call in like that of *C. tibetanum*. When alarmed, they usually fly into a tree; the flight is heavy and usually downhill. The beaters on seeing these birds would make a noise like the barking of dogs, on which the birds fly into a tree and are easily shot. A well-grown young one on the Putrang La on 24th August. These birds are trapped by Tibetans in the Lower Tsang Po Valley. Adult specimens in the flesh measured males 31½″, 33¾″, 35¼″ and females, 34″ and 34⅛″."

Bailey sent some home to the Edinburgh Zoo but whether they reached there alive or not I don't know. They certainly wern't there when I visited it in 1929.

The sketch was done from a live cock in Bailey's aviary at Gangtok.

Local bird names in the Darjeeling District.

It is a well-known fact that the Paharia is no naturalist, and, except in the case of the very common birds, there appears much diversity of opinion as to the real name, if any, of a large number of birds. The average Paharia cannot recognise, and name, more than a dozen species and any small bird is usually termed "phista" and any medium sized one "biakura" or "kolkolay".

There are, however, quite a number of names used by the more observant of rural and tea garden population, that appear to be fairly constant and I append a list of all that I have been able to collect in recent years.

The numbers refer to the Fauna of British India (Birds), 2nd Edition, and the names marked with an asterisk are quoted from Dr. Satya Churn Law's list in the Journal of the Asiatic Society of Bengal of June 1933, to make as complete a list as possible.

7 Himalayayan Jungle Crow *Kāk.* काक

11 Common Indian House Crow. *Mădēsi Kāk.* मदेसि काक

22	Yellow-billed Blue Magpie.	*Lāmpuchāri.*	लाम पुछरे
24	Green Magpie ...	*Dōrī Kwēli.*	ढोड़ी कोइलो
32	Himalayan Tree-pie ...	*Kōkăli.*	कोकले
46	Himalayan Nutcracker	**Lek-bhāli.*	लेख भाले
59	Green-backed Tit ...	*Chinchin Kothi.*	चिचिन कोटे
89	Great Parrot-bill ...	**Tāti.*	टुटो
111	Cinamon-bellied Nuthatch	*Sūlsūli.*	सुलसुले
120	Rufous-necked Laughing Thrush.	*Biăkura.*	भ्याकुरा
128	White-crested Laughing Thrush.	*Kŏlkŏli.*	कोलकोले
132	Black-gorgetted Laughing Thrush.	*Kŭntay Kŏlkŏli.*	कन्टे कोलकोले
220	Rusty-cheeked Scimitar Babbler.	*Chūchay Biakura.*	चुचे भ्याकुरा
243	Mandelli's Spotted Babbler	*Khŏrkhŏray.*	खोरखोरे
270	Black-throated Babbler	*Moustay.*	मुसटे
311	Black-headed Sibia ...	**Chārchāri.*	चरचरे
351	Indian Red-Billed Liothrix.	**Jher-jheri*	झारझारे
376	Silver-eared Mesia ...	*Jher-jheri*	
380	Indian White-throated Bulbul.	*Auli Jūrĕli.*	औले जुरेलो
386	Himalayan Black Bulbul	*Kënki.*	क्यांको
397	Striated Green Bulbul ...	*Jogi-chāra.*	जोगी चरा
403	Bengal Red-vented Bulbul.	*Kālay jūrĕli.*	काली जुरेलो
405	White-cheeked Bulbul	*Tārkay Jūrĕli.*	तारके जुरेलो
495	Indian Bush-Chat ...	*Dūyirē.*	ढुईरे

502	Western Dark-grey Bush Chat.	*Duinchi.*	दुईंचे
518	Eastern Spotted Forktail	*Dhōbīni.*	धोबीनी
519	Slaty-backed Forktail		
558	Indian Magpie Robin ...		
605	Chestnut-bellied Rock Thrush.	*Singāney.*	सिंगाने
606	Blue-headed Rock Thrush		
614	Himalayan Whistling Thrush.	*Kolchūra.*	कलचुड़ा
665	Verditer Flycatcher ...	*Hŭrini.*	हरीनी
700	White-browed Fantail Flycatcher.	*Năkalichara.* *Bijwani chara.*	नकली चरा विजुवानी चरा
712	Indian Black-headed Shrike.	*Bădraia*	भद्रायो
716	Grey-backed Shrike ...		
733	Indian Scarlet Minivet	*Rāni chăra*	रानी चरा
739	Assam Short-billed Minivet.		
753	Dark Grey Cuckoo-Shrike.	*Krishna chăra.*	कृष्ण चरा
	(Its note is described as *Krish-na-ki*)		
759	Large Himalayan Cuckoo-Shrike.	*Rew rew*	रिउ रिउ
763	Ashy Swallow Shrike ...	*Mŏrāli chara*	मुरली चरा
767	Himalayan Black Drongo	*Cheebay*	चिबे
774	Himalayan Grey Drongo		
780	Northern Bronzed Drongo		
782	Indian Hair-crested Drongo		
789	Large Racket-tailed Drongo.	*Bhingūna*	भिंगुना
814	Burmese Tailor Bird ...	*Phīsta*	फिसटा

896	Yellow-billed Flycatcher Warbler.	*Moustay jhĕr-jhĕri.*	सुसटे झारझारे
	(Applies equally to any Willow or Flycatcher-Warbler).		
913	Blandfords', Bush Warbler	*Jūri phīsta*	जुरे फिसटा
923	Brown Hill Warbler ...	*Chĭbūrki*	चिबुरकी
928	Black-throated Hill Warbler.		
961	Maroon Oriole ...	*Jhōlay phīsta*	झोले फिसटा
964	Indian Grackle ...	*Māina*	मैना
982	Grey-headed Myna ...	*Chāhchăr*	चाँचर
996	Common Myna ...	*Rūpi*	रुपी
1024	Hodgson's Munia ...	*Kōtēra*	कोटेरा
1097	Burmese House-Sparrow	*Bhanghēra*	भंगेरा
1101	Malay Tree-Sparrow		
1142	Crested Bunting ...	*Buī-jūrĕli*	भुंई जुरेली
1152	Eastern Swallow ...	*Ghŭr-gaonthŭli*	घर गौंथली
1161	Hodgson's Striated Swallow.	*Bir-gaonthŭli*	भिर गौंथजी
1175	Indian Blue-headed Wagtail.	*Khōla-Bhagēra.*	खोला बगेरा
	(Applies to all Wagtails)		
1186	Indian Tree Pipit ...	*Chuiyah.*	चुंईया
1248	Northern White-eye	*Ruïnta*	रुंईटा
1262	Indian Yellow-backed Sunbird (or any Sunbirds).	*Bālsi chăra*	बलदी चरा
1293	Indian Streaked Spider-Hunter.		
1335	Long-tailed Broadbill ...	*Auli sūga*	औली सुगा
1353	Large-Yellow-Naped Woodpeeker.	*Jōgi-lānchay*	जोगी लांचे

(Other Woodpeckers are called *lānchay*).

1427	Great Himalayan Barbet	*Niāoul*	नेउल
1432	Assam Lineated Barbet	*Kūtūrka*	कुथुरका
1452	Asiatic Cuckoo ...	*Kūkū*	कुक्कु
1454	Himalayan Cuckoo ...	*Chăgdūndūn*	छक धुन धुन
1455	Small Cuckoo ...	*Ghărti chăra*	घरती चरा
1456	Indian Cuckoo ...	*Gotālay chăra*	गोठाले चरा
1462	Indian Plaintive Cuckoo	*Sūbee chăra*	सुबी चरा
1479	Large Himalayan Green-billed Malkoha.	*Kwēli*	कोईली
1504	Himalayan Slaty-headed Paroquet.	*Sūga*	सुगा
	(Applies to all Paroquets)		
1519	Burmese Roller ...	*Thēwa*	ठेवा
1520	Broad-billed Roller ...		
1529	Blue-bearded Bee-eater	*Bui ni-aoul*	भुंई नेउल
1532	Himalayan Pied Kingfisher.	*Chāñgi*	चाँगि
1563	Great Hornbill ...	*Hongraio*	होङरायो
1565	Large Indian Pied Hornbill.	*Dhănēsh*	धनेस
1580	Tibetan Hoopoe ...	*Pāpăray chăra.*	फाफरे चरा
1586	Red-headed Trogon	*Bhāñs ko chăra.*	बांस को चरा
1596	Nepal House Swift ...	*Bir gaonthuli*	भिर गौंथली
	(Applies to all Swifts and Swiftlets).		
1626	Japanese Jungle Nightjar	*Kāmi chara*	कामी चरा
1647	Himalayan Brown Wood-Owl.	*Hoo-chīl*	हुचील
1663	Forest Eagle-Owl ...	*Kwayrālo*	कोईरालो
1672	Eastern Spotted Scops-Owl.	*Gōl simăl*	गोल सिमल

1690	Burmese Barred Owlet	*Lātkŏssĕra*	लाट कोसेरा
1705	Cinereous Vulture ...	*Lāma gīda*	लामा गिद्द
1736	Black Vulture ...	*Gīda*	गिद्द
1741	Himalayan Kestrel ...	*Bessāra*	बेसारा
1754	Rufous-bellied Hawk-Eagle	*Jŭmălkāt*	जमल काठ
1755	Indian Black Eagle ...	*Kālay chīl*	काले चील
1760	Hodgson's Hawk-Eagle	*Jūri chīl*	जुरे चील
1765	Indian Crested Serpent Eagle	*Gūrūl* / *Kākākūli*	गड़ुल / काकाकुली
1787	Common Pariah Kite ...	*Chīl*	चील
1796	Long-legged Buzzard ...	*Thāngne chil*	थाङ्ने चील
1803	Indian Shikra ...	*Bāz*	बाज
1812	Indian Sparrowhawk ...		
1840	Pin-tailed Green Pigeon	*Hālesso*	हलेसो
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1852	Indian Emerald Dove ...	*Sūndookūr*	सुन ढुकुर
1873	Indian Spotted Dove ...	*Dookūr*	ढुकुर
1884	Bar-tailed Cuckoo-Dove	*Hookūs*	हुकुस
1897	Common Peafowl ...	*Moozūr*	भूजुर
1903	Common Red Jungle Fowl.	*Luinchay*	लुंइंचे
1920	Black-backed Kalij Pheasant.	*Kālij*	कालीच
1928	Monal ...	*Dhāpay*	डाँफे
1931	Crimson Horned Pheasant.	*Monal*	मुनाल

1959	Rufous-throated Hill-Partridge.	*Peūra*	पिउरा
1997	Burmese Bustard-Quail	*Buttai*	बट्टई
2034	Eastern Common Crane	*Karung-Kūrung.*	कारङ कुरुङ
2167	Woodcock ...	*Sim kūkra*	सिम कुखरा
2168	Wood-Snipe ...	*Chăhāss*	चहास
2216	Eastern Purple Heron ...	*Hŭtitem*	हुटो टङांङ
2227	Cattle Egret ...	*Bogula*	बगुला
	Any wild Goose ...	*Raja hanss*	राजा हाँस
2288	Any wild duck including Eastern Goosander	*Pani hanss*	पानी हाँस

W. H. MATTHEWS,
The 9th June 1934.

"Sanctuaries for wild Game" and "the Protection of Game."

Under the above titles appeared two short articles in the June 1930 issue of "The Indian Forester".

These were of special interest to the writer, he having spent many years of service in this country much of which has been closely associated with jungle life both in India and Burma.

These associations have afforded from time to time unique opportunities of sport with gun or rifle, and of a close observation of the conditions under which protection is afforded to the game animals of British India.

Briefly the laws relating to the preservation of game have as their object :—

(1) The reservation of certain forest areas controlled by the Indian Forest Department, in which it is unlawful for any person to enter therein for the purpose of shooting game without a permit.

(2) A close season for the protection of game during the breeding season.

(3) Sanctuaries consisting of certain selected reserved areas for the absolute preservation of game throughout a definite period or for all time.

Admirable as these laws may seem it is evident that they are to a large extent ineffective in operation since each year sees a general diminution rather than an increase in the wild animal life of our forests. The reason for this general decline is popularly attributed to the advent of the high velocity rifle and of the motor car but however much th ese two factors may have contributed towards the wholesale destruction of game in other parts of the world, the harm being done in India cannot, with any real knowledge of the circumstances, be attributed to these agencies.

Let us first consider the case against the high velocity rifle.

In a country where the shooting of game is not controlled and everyone and anyone is at liberty to shoot as he pleases, the use of the high velocity rifle as compared with the older fashioned weapons has undoubtedly brought destruction in its train, but the conditions are very different in India. The shooting of game in reserved forest areas is strictly controlled, as far as the European sportsman is concerned, by the issue of permits under which are definite rules regulating the number, sex and species of animals that may be shot. In the fixing of these limits presumably account is taken of all such factors as would operate detrimentally towards the preservation of game. It is by no means apparent therefore how the use of high velocity rifles can affect the destruction of game beyond these prescribed limits. Such weapons moreover are almost exclusively in the possession of European sportsmen.

As regards the motor car, this has facilitated access to forest tracks which were rarely visited by European sportsmen before the advent of these transport facilities, it has also afforded a welcome means to the officers of the Forest

Department of better supervision of these outlying tracts, so, apart from the rare instances under circumstances which may favour its misuse wherein it becomes possible to employ the motor car in the shooting of game in an illegitimate and unsportsmanlike manner, it is contended that more good than harm has followed in its wake, as will be discussed later.

The forest game laws make a great appeal to the average European sportsman. He is intent on the strict observance of these, not only because they tend to enhance his prospects of sport but from a sense of fair play which is his inheritance. So far, therefore, as the European sportsman is concerned, and their numbers are comparatively few, these laws operate effectively. In the close season the European sportsman is conspicuous by his absence.

Can the same be said of the native shikaree or poacher ? These, in the writer's opinion and in the opinion of many other observers, are the root cause of the unwholesome destruction to game and the real enemies to the successful conservation of game life in this country.

Can it be acknowleged for a moment that these individuals have any respect for the laws that aim at the protection of game ?

The writer has yet to learn of an instance of any native shikaree, apart from the professional poacher, who is not out to break these laws at the first opportunity.

This, obvious to any one who has been closely associated with jungle life and with a knowledge of mentality of the class of individulal referred to, and yet these game laws in their very nature, giving credit to all men as being sportsmen, by following a European code, play into these poachers' hands.

It has just been stated that the European sportsman in the close season is conspicious by his absence and it is then, more than at any other time, that the poacher gets his opportunity.

Many of these reserved areas are far removed from District or Range head-quarters and so lack supervision. They are thus left, for long intervals, entirely in the charge of forest guards on meagre salaries. These forest guards are not only low paid, but in the very nature of their duties many of them are obliged to live a life of exile away from their homes and families among strange aboriginal tribes who alone populate these forest regions. Admirable as their services under these unattractive circumstances may appear, it cannot, for a moment, be supposed that such services are rendered from an entire sense of devotion to duty. Unfortunately the frailty of human nature is prone in these circumstances to temptations and the impecunious forest guard, whatever may be said to his credit, takes every advantage which comes his way of feathering his nest, and how could it be otherwise?

There can be no doubt whatever that for a consideration, he surreptitiously connives with those who would unlawfully slaughter game in Government reserved forests. The many machans, especially in outlying tracts, one sees over water-holes in Government reserved forests afford irrefutable evidence of this.

A sanctuary for the absolute protection of game and where game can breed unmolested is regarded by all sportsmen as a sacred area in which no white man, bar the Forest Officer, on his occassional advertised rounds, ever enters. Such an area may be described as the poacher's paradise. Taking advantage of the infrequent visits of the white man and of the susceptibilites of the low paid forest guard to increase his emoluments our enemy poacher reaps a heavy harvest. The writer has, personally, observed, in such areas where carnivora alone may be shot, machans built over many water holes and the forests guards, who zealously accompany sportsmen on these occasions, loath to draw his attention to these, a guilty conscience no doubt.

In such circumstances is it surprising to find slowly yet surely a general diminution in numbers of the wild game animals that affect these forests ?

Take as an example the game in the Nilgiri District in the South of India. Very special measures have now been in force for a considerable number of years in this District for the preservation of game under the custodianship of the Nilgiri Game Association, a very alert body wholly engrossed in the protection of game and out to punish any European for inadvertantly, or otherwise, breaking any of the forest laws. Yet what results, towards the increase in game, it may be asked have they achieved ? It is a well known fact that game in the district is becoming more and more scare every year, in spite of seasonal modifications imposing further restrictions in the shooting rules intended to meet changing conditions.

Forty or fifty years ago the plateau regions of this District were virtually a sportsman's paradise, yet in spite of the admirable attempts to conserve the game on these hills, nothing but reports of deterioration, both in numbers and size, attach to these laudable endeavours. The spread of civilisation no doubt indirectly accounts for this, for where there is civilisation there is a demand and where there is a demand in comes the poacher to furnish the supply and he, beyond doubt, is mainly and directly responsible for this deterioration. The above remarks have special reference to the animal inhabitants of the Nilgiri forests, but an annual deterioration in small game is also very noticeable. This may be partially accounted for by the opening out of the country, whereby large areas of scrub have been thrown open to the cultivation of tea, and, moreover, in this particular case the motor car has also taken toil, by affording ready access to small game shooting grounds which were beyond the daily range of sportsmen in days of yore. Yet, amongst small game too, the activities of the poacher are ever present and ever relentless.

Such instances bear evidence of the damage done by surreptitious poaching, either with the connivance of the forest guards, or, less frequently, without their knowledge, and thus not coming to the notice of the Forest Officers or to the game associations is likely to be discounted. The damage done by this means is inestimable and the various

reasons advanced attributing the causes to other improbable agencies arise from a natural desire to avoid acknowledgment of the unsavoury truth, an uncomplimentary reflection on the workings of any society organized for the protection of game. Yet if game is to be preserved the truth has to be faced.

The poacher or native shikaree, there is little distinction in their ethics, naturally favour localities in which they are not likely to be intruded upon in the execution of their ill-deeds and thus it is that the motor car, by providing easier access both to sportsmen and Government officials to these outlying forest tracts, operates in the interests of game protection and the writer is firmly of opinion that the motor car has done more good in these ways than harm in other.

This poaching has considerably increased in recent years as a result of the new arms act under which to obtain possession of a firearm is a comparatively simple matter.

Under the pretext of crop protection many gun licenses are applied for and granted each year and the weapons thus obtained are frequently put to illicit uses. For the *bona-fide* protection of crops nothing more is required than a short barrelled inoffensive firearm to scare away animals. The intention should not be to destroy but to frighten. The wild pig menace to crops, in certain tracts, may be regarded as sufficiently serious to warrant their extermination, but this is more than likely to be made the excuse under which extensive poaching operations become possible.

Each such application for a gun license is deserving of very special investigation and due discretion exercised in the granting of these.

It is admittedly difficult to suggest a remedy that would effectively stay the hand of the poacher yet much might be done, towards this end. if appropriate action is taken, From the writer's observations such action would appear to lie in the following directions.

(1) Careful discrimination should be exercised in the issue of gun licenses and for the protection of

crops a restriction in the length of gun barrels should certainly be imposed.

(2) In no event should possession of lethal weapons be permitted to owners of lands lying adjacent to Government reserved forests.

(3) The salaries of forest guards should be raised and so attract to the service a better class of individual.

(4) An adequate reward should be granted to any subordinate forest employee for the arrest and conviction of any person found to be poaching game in reserved forests.

(5) The law should be stiffened up and provide for severe penalties against such offenders, so that harsher sentences may act as a deterrent. It is no use fining a poacher a few rupees which is invariably the only punishment meted out. It pays him in these circumstances to poach.

(6) Sanctuaries should be thrown open to shooting, unless they can be closely supervised all the year round; the more such places are visited by true sportsmen, the less chance for the poacher and the better would be the prospects of preserving game. The sportsman does far less harm, in his restricted rounds, than the poacher does unmolested.

(7) Difficulties should not be placed in the way of sportsmen wishing to obtain permits to shoot in Government reserved blocks; such sportsmen should be encouraged in every possible way. Their presence on these occasions has a salutary effect in the observance of the forest rules, both by forest subordinates and would be poachers. They should specially be asked to report on any breach of forest game laws that have come to their notice during their visits, apart from reporting the number of game animals shot.

Many sportsmen are keen observers and their remarks on the general condition of game in the areas visited would be invaluable.

(8. The sale of game in the close season should constitute a criminal offence and trade in the skins of wild animals should be strictly penalized.

In conclusion it may be said that the foregoing remarks are not intended in any way to cast discredit on the distinguished attempts that have been made and are being made for the protection of game. But for this devotion to the cause game would have become extinct in many areas where it still survives, and rare in those areas where it still thrives. The purport of this article is to draw attention to the serious menace to the existence of game caused by poaching and to indicate in what ways it is possible for the poacher to carry on his nefarious deeds, in spite of what appear to be admirable forest laws.

If only in small measure, as a result of this writing, action be taken to mitigate this evil, the writer will have rendered a small service to the game animals of this country, and therein will lie his reward.

N. PRIMROSE,

The 15th July 1930.

[These interesting notes on Sanctuaries and Game Preservation were written years ago by the late Mr. N. Primrose and handed over to me by his brother Mr. C. Primrose, one of our best and most valued contributors. Now that the Preservation of Wild Life is so much to the front these notes, written by a keen sportsman, may prove interesting, and instructive, to our readers.—[*Editor*].

Motifs and inspirations for designs derived from Nature.

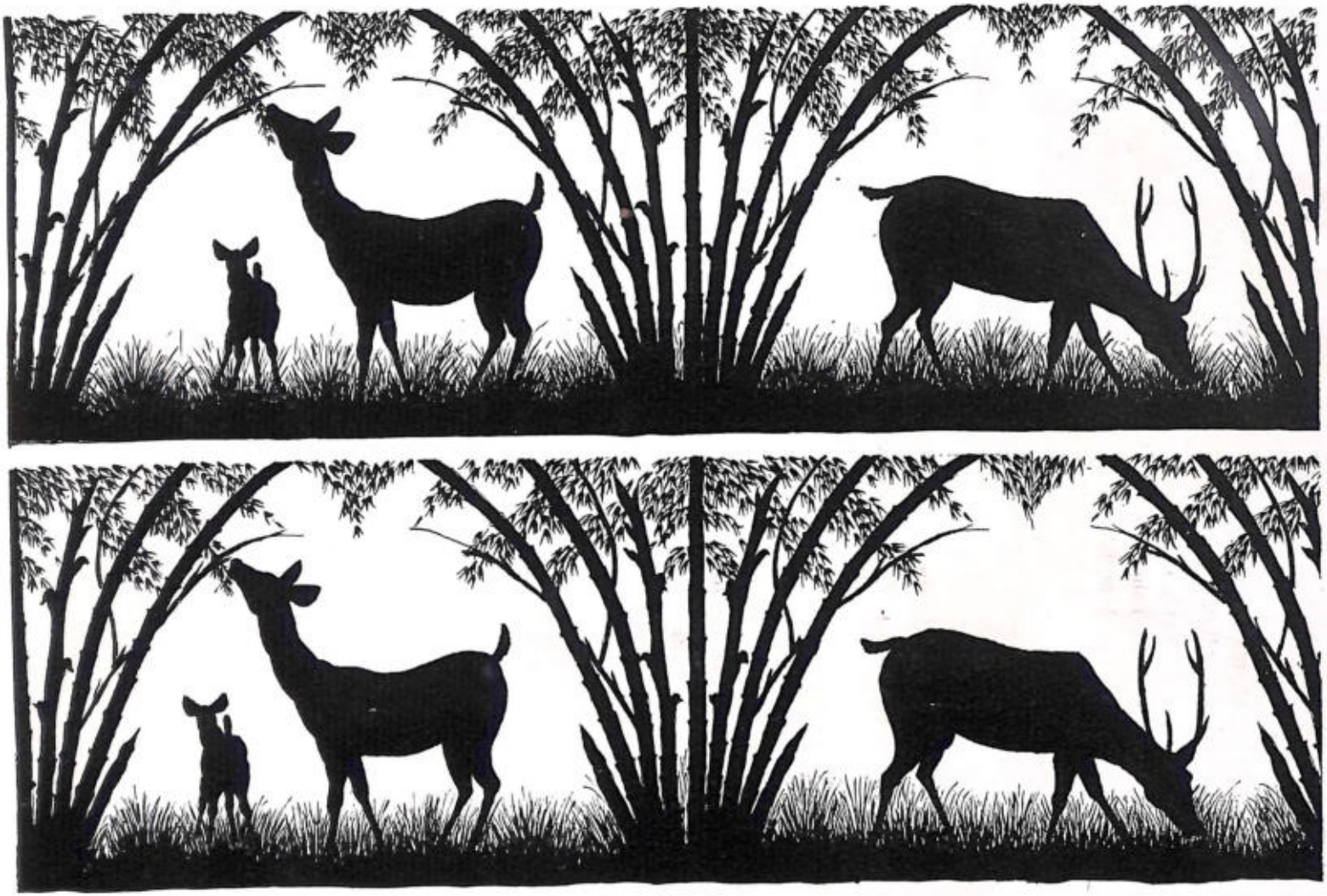
(With a black and white illustration.)

From recently having studied the subject I have come to the conclusion that the desire to create design or patterns is inherent in almost all humans. So very few, however, are ever called on to develop this talent that it is killed quite early in life. Designing may be said to be the artistic division of a given space by a pattern or motif repeated at regular intervals. It may vary from purely geometrical shapes, drawn with ruler or compasses, to conventionalised plant forms following geometrical lines which are afterwards removed. As even plant forms, when used as a motif, have

We are unable to give this illustration in one continuation as by doing so it would have made it too small so have halfed and although this has meant duplicating the same design it shows how the design is carried on.

Editor.

Bamboo and their [illegible]
designs. My interest in designing having been aroused I looked to my old friend, the Indian Jungle, for inspiration. Alas! I find that, that portion of my brain from which designing should come having been allowed to atrophy, the inspiration which objects and scenes in the jungle undoubtedly afford fail to meet with the requisite response from any brain. Such stimuli as the jungle affords have, however. started a feeble vibration in the designing department the result of which is the illustration reproduced. It is intended as a design for a lampshade and, in the Chinese colouring selected by me *viz* jet black against very deep orange, is by no means displeasing as such. The spot where the jungle scene inspired me with the idea of the design was on the road to Mysore and a few miles beyond the N. W. boundary



of the Nilgiri District in Mysore territory. Seated in a cramped and uncomfortable position in an overladen; noisy and labouring bus, which, if it had any springs, were quite unable, owing to overloading, to function as springs or shock absorbers, we jolted and swayed our way, Mysoreward, in a cloud of dust and fumes from the exhaust. We were passing through a portion of forest consisting almost entirely of Bamboo when the driver suddenly attempted to bring the contraption to a standstill. Fortunately, for the passengers, the violent application of all available brakes was unable to stop it under some 15 yds. else bad language and bruised bodies had been the result. The driver pointed to the right as we stopped and there, 20 yds. away among the Bamboos, was a group of four Spotted deer. They have become quite accustomed to the noise and sight of these buses and paid no attention to this one. The single stag carried quite a fair head, whilst the young fawn which was in the group had not outgrown that "leggy" stage common to the young of almost all animals, I say almost, because I have yet to see a 'leggy' weasel, young or old. Such legginess is probably at its worst in a young Giraffe but that's another story. After admiring the beauty of the group, undoubtedly enhanced by their surroundings, a shrill "Raight Raight" from the conductor started the driver into action once more. With a shrieking of gears and in a cloud of of dust and evil smelling exhaust fumes, the apparently, square-wheeled Juggernaut staggered, Mysorewards, once more. Possibly the frequent and painful jarring endured for 4 hours, in this fearsome vehicle fairly bumped the design into my very fibres but there it is. Long after my return (Not by bus) from Mysore, and when only a pale ochre showed where the worst bruise sustained had been, I sat down to design a lampshade and the motif supplied by that jungle scene came clearly and readily before me. The result is the only drawing I have ever done that can claim to have a vestige of Design about it *viz.*, the artistic division of a set space by a geometrically guided Motif repeated at regular intervals. But, it's a serious but, the space has not really been artistically divided as my more artistic readers will see at a glance. Rich colouring however detracts the

eye from this defect as any can prove if they care to copy the illustration in deep orange and black. I have come to the conclusion therefore that jungle scenes do, if one is able to receive them, offer inspirations for motifs which can be employed in pleasing designs. I have an idea that I once saw Langurs playing "Follow my leader" over bending branches reflected on the surface of a still pool of a jungle river that might be done. Somewhere else there were festoons of Flying Foxes, some asleep, some drowsy and all using filthy language against the heat of the afternoon. That could be worked into an effective motif, not the language, oh dear no, the Editor wouldn't allow it, even if, which is impossible, it were reproducable in black and white, only ten Flying Foxes hanging in festoons. Then again, in Central India, in an old *bagh* or walled garden, built in the Moghul days by some noble that his ladies might "take the air" secure from the vulgar gaze, was a rapidly crumbling pavilion, the windows were of beautiful design in red sandstonee and on sills, on which in those artistic days many a beautiful arm had leaned, a Peacock was displaying. So you see there is Design in Nature if you can see it but before you can hope to do so you must feel it. Should, at a later date, any further illustrated notes appertaining to such stupid subjects as "Flying Foxes displaying in theTombs of Kings" or "Langurs vituperating over water" etc., be published in the Journal, go for the Editor. But no, he is not to blame as though, among the members are quite a number who, if they would, could help him by writing articles, they wont do so. No doubt they are too busy but if the Editor, in desperation, is compelled to accept such poor stuff as my feeble pen affords, it is their fault, not his. Talking of being "too busy" reminds me of the following story, "The Minister walking along a lane came across one of his flock, Angus, sleeping off the effects of a recent debauch under a hedge. Hearing footsteps approaching Angus awoke and gazed stupidly at the Minister. "Well Angus, said he, I see you'r awful beesy the day. Na, Na Meenister its the Deil that's beesy I'm happy, replied Angus. I hope some readers haven't heard that one.

C. PRIMROSE.

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EDITED BY

C. M. INGLIS, F.Z.S., F.R.E.S., B E.M.B.O.U.

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Dates of issue

Number 1	(Pages 1 to 35)	... June 1935.
„ 2	(Pages 36 to 72)	... October 1935.
„ 3	(Pages 73 to 116)	... January 1936.
„ 4	(Pages 117 to 163)	... April 1936.

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At the suggestion of one of our Members we append a list of published coloured plates.

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The Atlas Moth	Vol. V.	No. 4 April 1931
The Golden-throated Barbet ...	Vol. VI.	No. 1 June 1931
The Indian Emerald Dove ...	Vol. VI.	No. 2 October 1931
The Himalayan Tree Pie ...	Vol. VI.	No. 3 January 1932
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ALCEDO MENINTING COLTARTI
The Assam Blue-eared Kingfisher
ALCEDO ATTHIS BENGALENSIS
The Common Indian Kingfisher

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CISSA CHINENSIS CHINENSIS (BODDAERT)
The Indian Green Magpie
from
a specimen collected in the Kumaoni Forest on 19/1/1934
The shrub represented is Tabernaemontana coronaria
2/5 Nat. size

JOURNAL

OF THE

DARJEELING NATURAL HISTORY SOCIETY.

Vol. X.—No. 1.

The Green Magpie.

Cissa chinensis chinensis (Bodd.).

By

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

With additional notes

By

Col. H. S. Wood, I.M.S.

(With a Coloured Plate).

The birds of this genus are very beautiful. They differ from *Urocissa*, the Blue Magpies, in having very much shorter tails and wattled eyelids and from other Magpies in their red bills and legs. The wattles of the eyelids are most noticeable in life but are also so in fresh skins.

There are a number of species and subspecies of the genus *Cissa*, French Indo-China being especially favoured as Messieurs Jean Delacour and Jabouille describe no less than six from that country, our bird being one of them. In India there is only one, the typical form, and Ceylon can boast of one of its own.

The following notes, except these by Col. Wood have, mostly, appeared in our Journal *Vol. VI. No. 3* but we reprint them to make this article more complete.

Field identification :—A beautiful, rather stoutly built, yellowsh-green Magpie, with a black band through the eye

to the nape, and red bill, legs and rims to the eyelids. It keeps principally to forest below 5,500 feet, where its loud, harsh, discordant cry generally reveals it's presence. Often seen in the company of Laughing—Thrushes, etc.

There is no necessity to describe the bird as the Coloured Plate shows the colours sufficiently well.

The iris in the adult is blood-red ; "pale blue-brown in young birds" *(Stuart Baker,)* yellow *(Delacour)*.

The plumage in ill health and where skins are at all exposed to light changes. The yellow pigment is evanescent and leaves the plumage a cœrulean blue ; the red on the wings also becomes duller. We have been able to keep cabinet specimens for some time, in their original colour, by wrapping them in red-coloured papers, one specimen which we have had for five years is still mostly green ; but it varies, in two specimens collected in January 1934 one is still in perfect condition (end May 1935) and the other has blue patches on the back ; in a ten years old specimen the forehead and throat still show signs of the yellow pigment but the wings have changed to olive-yellow. We are often asked by visitors, who see a blue bird exhibited, why it is called a green Magpie when it is blue ? So have had one of these coloured plates framed and placed near the specimens.

Distribution :—In our Area :—From plains level in the Duars up to about 5,500 ft. in the Hills. It is resident wherever found.

Outside our Area :—Himalayas from Jamna Valley to the extreme East of Assam, North and South of the Brahmaputra, Eastern Bengal, Burma, Shan States and Northern Siam" *(Stuart Baker)*. In French Indo-China Delacour and Jabouille say it is found in the whole of Tonkin, the North of Annam and in Laos.

Habits etc :—This beautiful Magpie inhabits, principally, thick shady forest but is also met with in bamboo and deciduous forest. Some, at any rate, are very local in their

habits. There is one bend on the road, between the Mangpu Cinchona Plantation and Sureil where one can nearly always hear, if not see, one of these birds. We have twice seen them in a small patch of trees in the compound of a tea garden in the Duars, quite a long distance from the forest, but this is unusual. They are often found in the company of Laughing—Thrushes and other birds, in hunting parties, often only one Magpie being with the flock. Formerly O'Donel found these Magpies in quite large flocks but not of recent years. We have only noticed them singly or in pairs. Their notes are very harsh but they also often mimic other birds. Stevens syllabalizes their notes as a quickly repeated *peep, peep.* They are shy birds, and, although so brightly coloured, are not very noticeable in the heavy forest but their note generally gives them away. In the more open, or deciduous forest, they are, of course, more easily seen.

They feed both on trees and on the ground and their food consists of insects, especially the larger ones such as grass-hoppers, mantids, beetles etc., also lizards, young birds, etc., A specimen we had, in captivity, killed, and ate, a full grown Hoopoe. In captivity they become very tame and have lived up to 6 years in the Calcutta Zoo.

They breed principally from April to June making a cup-shaped nest of twigs, leaves, grass, etc., lined with roots and placed in a clump of bamboos, bush, or sapling. According to Stuart Baker, in Assam" most nests were placed in small trees or saplings, sometimes in high bushes, occasionally in tangles of raspberry vines or other creepers or very rarely, in bigger trees. Few nests are found over 20 feet from the ground, while often they may be within five or six, I have seen a few nests with eggs in the end of April and, on the other hand, have taken fresh eggs on the 23rd July and 6th August" He also says "A rather favourite haunt was some deep rocky ravine running through a copse surrounded by open grass land but, in such cases, the jungle was always thick and the cover good." They also, according to the same observer, selected trees near streams or pools where the sun could penetrate.

They lay from 4 to 6 eggs which vary much in appearence. Stuart Baker who had a huge series says they "vary from white faintly and sparsely speckled with pale reddish to buffy-brown densely freckled with reddish-brown all over, the freckles coalescing to form rings or caps at the larger end. Between these extremes, which are rare, there is every intermediate phase of colour." He gives the average of 200 eggs as 30·2 × 22·9 m.m.

Additional Note

By

Col. H. S. Wood I.M.S.

This bird was very numerous in the Sylhet district especially where it borders on the Tipperah Hills. It is one of the favourite cage birds of the Sylhetis, kept, I think, for the beauty of its plumage, as one which I kept made no song except a chattering.

It is a shy bird confining itself to heavy jungle, Ringal seems to be a favourite type. They are savage and blood-thirsty and feed on lizards, frogs and the young and eggs of birds. When sitting up over kills I have seen these birds descend on to the kill, tear away great morsels of flesh and gulp them down. When I had mine in captivity I, unfortunately, placed my Shama's cage too close to one of these birds and found the Shama with one of its legs almost torn away and had to amputate it. The most extraordinary thing I have noticed about the Green Magpie is its behaviour with a peach worm. After the worm has coiled up, as it does on touching it, the Magpie takes it in its bill and methodically preens its wings with it; the Peach worms' legs acting as a comb. The birds did this with every Peach worm I gave them and a rustling noise was produced during the operation showing how vigourously the bird used it. It is well known that this bird although blue, at first, in captivity turns green. This is interesting as I have never seen a green wild one. (We cannot understand this as the wild birds which we have seen, a very large number, have been *green* with *sometimes*

a *few* blue patches on them. Birds which are not in the best of health are said to become blue but we, certainly, consider *green* to be the normal colour. One which we had in captivity was that colour. *Editor*).

Most of this species which I saw in Sylhet, at the foot of the Tipperah Hills, appeared to me blue, whereas those I saw in the Cachar Hills were green. In Sylhet I found them in dense Ringal jungle interpersed with a few forest trees; whereas in the North Cachar Hills I saw them in forest. These Sylhet jungles were damp and dark. Would sunlight have any effect on the colour? The pancity of it producing the *blue, e.g.* in those kept in captivity, where they do not get enough sun the *green* turning to *blue*. Or is it some particular food which prolongs the green? I do not know. (I do not think these can be the correct reasons as why is it that other green birds seem to retain their green colour? Perhaps Dr. Law, who has vast experience in keeping birds of green and other colours, may have some suggestions to make. So far as we are aware it is only in the Green Magpie that this extreme difference in colour is found. Certainly no other of our cabinet or mounted birds of this colour have changed like this. We cannot understand it. *Editor.*) It is a fact that a sea-green sea seen through foliage appears blue, so, perhaps, the bird when seen through thick foliage appears blue. (This cannot be the reason as that does not show why, in cabinet specimens, the green turns blue. *Editor.*) These are questions still to be solved. I have also noted that when the green bird turns blue, the red colouration of the bill also gets dimmer.

Some Observations on the Tiger.

By

COLONEL H. S. WOOD, I.M.S.

(With a half-tone plate.)

The chief purpose of this article is to raise a discussion as to which of the senses of a Tiger is most acute. There is a diversity of opinion amongst naturalists and sportsmen about this. Some say that sight comes first, others smell

and others hearing. After a long experience with the Tiger, and his ways, I have come to the conclusion that hearing comes first. Its upright cup-shaped ear is admirably adapted for receiving sound vibrations; the tympanic *bullae*, in the dried skull, which are connected with the internal ear, are very large and well developed when compared with those of other animals. It is well known to shikaris that the faintest sound made, in a machan when sitting up, will keep a Tiger from coming to the hill. The Tiger, provided with his soft pads and moving silently in the jungle, is aware of the faintest sound, be it the crushing of a dry leaf or the crack of a broken twig.

The next sense, in order of merit, is sight. The iridescent *tapetum*, found in the interior of the eye in most carnivorous animals and nocturnal birds, enables the Tiger to have wonderful night sight. In fact he can see by night just as well as most animals can in daylight. In daylight, except when he is concealed under deep shadow, the eye sight is decidedly poor because the pupils are very much contracted and very few light rays reach the retina.

The sense of smell comes last, although, from anatomical investigation of the parts concerned, it seems that this sense is highly developed. The olfactory nerves are large and the ethmoidal sinuses of the nasal cavities, over the mucous membrane of which the olfactory nerves are distributed, are large and well developed. Some naturalists have suggested that, as the Tiger is accustomed to delve his nose into almost putrefying corpses, this sense has been greatly annulled. This is rather a far-fetched theory.

I believe that, in hunting his prey, the Tiger depends on all three senses. I have seen one, with his nose to the ground, following the track along which my live bait was conducted from a village to my *machan*. I had an uninterrupted view from about 200 yards, as the bait was tethered close to a long, broad Government Road. Then again I know of a tree, overhanging an extensive *bheel*, which sloped at an angle, which a Tiger used to climb to get a good view and spot any deer. I found this out by discovering dry clay

and Tigers' hairs high up in the fork of the tree. The Man-eater of Kharupatia ghat, in the Tezpur district, used to ascend a sloping *simul* tree to watch for a solitary milkman proceeding to the ghat to sell his milk.

Most animals trust to the sense of smell in following up their companions when separated. Observe a cow Bison or Buffalo. They always hold the nose close to the ground to give them the right direction. I have, also, observed this in the Porcupine. The beaters drove the female out of the jungle, she crossed a partly dried up *bheel*, and came up close to a hollow where I was concealed. I shot her and about ten minutes later the male emerged and followed the exact track of its mate, he was shot within a foot of his companion much to the delight of the beaters who would have roast "pork" for supper.

The whiskers of a Tiger give him an important fourth sense, that of feeling. No doubt they are for ornament too as a Tiger's head *without* whiskers is a travesty of beauty and I should same the same for a man without a moustache (Query ! *Editor.*). A hirsute appendage on the upper lip gives character and manliness to the face ; so much so that, in certain crack regiments, the edict has gone forth that all ranks should cultivate moustaches. In former days, in the Army, shaving of the moustache was looked upon as a crime and a subaltern of my regiment was asked to give his reasons, in writing, as to why he had shaved his moustache !! He went to a fancy dress ball as a baby and could hardly appear, in that character, with a profuse growth on his upper lip !!! After this digression let us turn to the Tiger's whiskers. Dissection reveals that each whisker is supplied with a well developed nerve. With such a delicate sensory apparatus the Tiger is apprised of any objects in his way, thorns, twigs of bushes etc., when moving through the jungles.

The way in which a Tiger kills is a matter for discussion and on this point there is much divergence of opinion, I will not enter into all the theories but, after examining and making post-mortems on many kills. I have come to the

conclusion that the Tiger's chief objective is to bite into the spinal chord either in the cervical, dorsal or lumbar regions, so as to paralyse his victim. If the neck is attacked the whole muscular structure is pulled away and one can put one's two fists into the wound. In the dorsal and lumbar regions where the spinal chord is more exposed, and the muscular structures lie alongside, no such hollow can be produced and one will only see the deep wounds made by the canine teeth. In larger animals such as buffalo, horses etc. the animal is hamstrung and is then at the mercy of his enemy. In some cases the animal is emasculated, as related in a former article of the Journal. In chasing the victim and making ill-timed springs the tuft of the tail is bitten through and I have often found this in following up the track of a tragedy. In the case of a solitary Bison there was no vestige of a tail, it had been pulled out by the root. The well marked scars on the beast's rump revealed that it was not accidental or congenital, but the work of a Tiger.

The Tiger always drags a kill backwards, here muscular strength is aided by the weight of the animal, but I have seen a Tiger drag a full grown bullock up a gradient of 45°, where, of course, weight would not count. I have also seen a Tiger drag a buffalo, on flat ground, for a distance 150 yards or so. Then a Tiger will snatch a "kill", in the twinkling of an eye, just as a cat carries away a mouse. From these facts, it can be concluded, that the strength of a Tiger is enormous, especially of the jaws. To prove that a Tiger drags his "kill" backwards one has only to observe the direction of the paws in the ground : these will always point in the direction of the dragged animal, the Tiger digging his claws into the ground to get a purchase.

There is discussion amongst sportsmen as to whether the Tiger or the Lion is the finer and stronger animal. The Lion has been styled the King of Beasts but I think the palm must go to the Tiger. One cannot judge from Tigers in a Zoo what really magnificent animals they are ; they are generally podgy and, from confinement, the entire muscles have undergone degeneration. To appreciate his beauty, symmetry of form and action one must see him in his natural



THE TIGER ON THE PROWL. *Photo by T. V. Deul.*

haunts. I think that if a Tiger and Lion came to grips the former would alwas be the victor. The Lion never has the perfect coat which one sees in a Tiger. Tigers have a coat on them with the sheen of that of a race horse.

Why and when do Tigers roar ? This is a disputed point. One cannot imagine that a Tiger roars when after his prey as this would upset the whole jungle and put his quarry on the *qui vive*. My opinion is that they roar only when mating, or when a Tiger and Tigress miss one another. I have heard a Tiger keep up a constant roar at dusk for half an hour until he reached the spot where I had shot his mate on the previous night. In another case where the Tiger was shot the Tigress tracked the corpse to our camp and kept roaring, at intervals, throughout the night, causing a panic amongst our servants and coolies. Sometimes a mewing sound is produced, this is more often the case when the cubs get separated from the mother. I do not believe that the Tiger can imitate the call of other jungle animals, Barking deer, Sambhur etc. The Tiger's roar, when heard in the distance, sounds very like that produced by a Burmese circular gong.

The charge of a Tiger may be silent or else he springs upon his assailant with a roar. They do not often speak when hit like the Panther but I have seen such instances ; neither do they bite at the site of injury as the latter animal does.

People, often, imagine that a Tiger is always found in impenetrable jungle but this is not so. Owing to the delicateness and softness of his pads he avoids very thick and thorny jungle. When on the prowl he generally selects paths made by other animals and unfrequented Government roads ; village paths are also a favourite route.

When he lies up, after a meal, he generally selects a bush, short, soft grass or sparse jungle on the bank of some stream ; where there are caves he will enter them but I have never found them do so in Assam.

The Tiger has a curious habit of sharpening his claws, almost daily, against a tree, preferably a *simul* which has a

soft bark, the red sap of which, the natives say, he likes to see beeause it is the colour of blood. This is the reason why when manled by a Tiger septecaemia is less apt to follow than in the case of mauls by a Panther. If one protrudes the claws of the latter animal one can see, at their base, the accumulation of septic stuff loaded with germs. The Panther cleans his claws by scraping them against the ground like a dog does after the purpose of nature has been satisfied.

The presence of these marks on trees often gives one valuable information of the whereabouts and size of a Tiger. If the marks are quite fresh, ten to one, the Tiger will return to that tree on the following might. I, once, shot a Tiger in this way but most unfortunately he got into heavy jungle and I lost him.

The behaviour of vultures, peafowl, monkeys and jungle fowl often betray the presence of a Tiger.

The Tiger starts eating at the posterior end of his victim, if a cow, the region of the udder is first attacked. His great objective is to get to the liver, heart and lungs. He, generally, has nothing to do with the intestines and never the paunch. This is the favourite titbit of the Wild Boar and, on two occasions, whilst following up a dragged kill, I have come across Wild Boar thoroughly enjoying the partly digested food of the paunch etc. A Tiger prefers fresh meat and, unless he is hungry, will not devour a corpse that is distinctly high. If he has been fired at, from a *machan*, he gets very cunning. He will have a meal and never return a second time.

There are other interesting points about Tigers but I have already written at length. For those who are interested may I refer than to my recent publication "Shikar Memories" published by Messrs. Witherby and Sons. 326 Holborn, London. In this work I have stated, fully what I know of the Tiger after an experience of 36 years ; the cause of their turning man-eaters, their food and many thrilling encounters with this splendid beast.

The Editor has kindly offered to illustrate this article with a flash-light photograph of a Tiger, which will greatly enhance its value for which I thank him.

[This excellent photograph was taken by Mr. T. V. Dent of the Imperial Forest Service, who most kindly has allowed us to reproduce it.—*Editor*].

Broadcast by E. O. Shebbeare, Conservator of Forests, Bengal.

Some of you may have read in the papers the accounts of a Conference held in Delhi at the end of last January about the Preservation of Wild life. It may interest you to hear something more about it—what it was all about and what suggestions were made there.

The idea of preserving wild birds and animals is not, of course, an altogether new one, but it is one that has come into the limelight only recently. I must not take it for granted that everybody who is listening to me is convinced of the necessity for preserving wild life at all, and I had better begin by telling you the objects of the numerous wild life preservation societies that have sprung up all over the world.

The best way for me to do this is to quote the objects laid down by one of these societies—the one that aims at preserving wild life throughout the British Empire. They are as follows:—

1. The main object of the Society is to ensure that no more species of wild animals shall be exterminated within the British Empire.
2. It considers that this can be best effected by the creation off a strong public opinion on the subject both at home and abroad, by furthering the formation of National Parks and permanent sanctuaries and by enforcing suitable Game Laws and Regulations.
3. It believes that practical steps can be taken by which every species of wild life can be

preserved without hampering in the slightest the economic development and civilization of our territories.

4. It is no part of the aim of the Society to preserve animal life to the detriment of human industry or the natural development of mankind; nor does it offer any opposition to the fair and legitimate pursuit of sport.

This last sentence shows that the society like most reasonable people, does not disapprove of fair sport. Sport is generally the foundation on which a love of wild life is built and, what is more, it is mainly sport on which we shall have to depend for the sinews of war in our struggle against the wanton destruction of wild animals.

Mankind has waged war on wild animals from the very earliest times—as soon as he was strong enough or skilful enough to do so. At first, as a hunter, he killed whatever would serve him for food as well as the beasts of prey that would otherwise have killed *him*. Later, when he had discovered the secrets of agriculture and the domestication of animals, he became a farmer and stock-breeder and, no doubt, killed the grazing animals that ate his crops as well as the carnivorous ones that ate his cattle. Even at this stage, although he no longer depended on wild animals for his food, he seems to have continued to kill anything that he could by way of sport and as a change of diet.

Naturally, with a history like that behind us, we are all of us born with the hunting instinct more or less strongly developed and this, to my mind, is all to the good. It is all a part of the love of nature, for you cannot help noticing that those who love nature most and are the keenest on its preservation, are the very ones in whom this sporting instinct is most strongly developed—those, in fact, who, in their youth first displayed their love of wild life by their energy in trying to kill it.

It was all very well for man to kill whatever he could, indiscriminately, in his early, savage days when he was poorly armed and engaged in a constant struggle against

wild nature. As his armoury improved, particularly when firearms were invented, the odds became heavier and heavier against the animals and man had to begin to handicap himself by means of game laws and close seasons. All the modern inventions, the motor-car and aeroplane, the spot-light and electric torch, demand further restrictions to preserve the balance between the number of animals killed and the natural increase in the stock of game.

No sportman objects to such reasonable restrictions made in the interest of the game, though, of course, opinions may differ as to what is reasonable and what is not. The true sportsman is more interested in the increase of game in his own neighbourhood than in a heavy individual bag. It is for this reason that I believe that the Shooting and Fishing Clubs of Northern Bengal will become the backbone of any scheme for the preservation of wild life in Bengal. These clubs, since they have leased the fishing and shooting in the Reserved Forests, have imposed restrictions on themselves in the interests of the game.

Of course the Shooting and Fishing Clubs are really only concerned with the protection of those birds, beasts and fishes that are considered game, though in practice they extend their protection to all wild things. Wild Life Preservation Societies are not only interested in game but in all kinds of wild life as well as wild vegetation and secenery. They also interest themselves in the foundation of what are known as National Wild Life Parks.

In all parts of the World nations are making sanctuaries to preserve their wild animals and natural vegetation which they now regard as a national heritage of their territory, to be held in trust for future generations. In these National Parks nature is left to herself and sightseers, besides enjoying the scenery, can watch the birds and animals in their natural surroundings.

In such places wild animals lose all fear of mankind in an unbelievably short time. Visitors can feed wild black bears from their motor-cars in the National Parks of North America and watch lions at close quarters and without

danger in the Kruger National Park in South Africa. One of the most thrilling sights in the world is to see the enormous herds of antelope and zebra, with occasional groups of giraffe, out of the train window as you steam across the Athi Plains in East Africa and to walk almost among them, zebra, wildebeeste, kongoni and gazelles, from the golf-course at Nairobi. There are sanctuaries nearer home in Burma and Assam and a newly established one in the United Provinces. One is almost tempted to hope that it may one day be possible to feed our Bengal rhinoceros on carrots !

More and more people every year are in a position to spend their holidays in sightseeing and, with the improved transport of the future, Wild Life Parks will become the great rival of mountain scenery and ancient monuments as an attraction for sight-seers. It will not be long before the countries that possess such attractions will reckon themselves lucky.

Another sign of the times is the way in which the sportsman traveller who, ten years ago was mainly a collector of trophies, has given up the rifle for the camera—an example set by the Prince of Wales. Every year more books on wild animals and birds are written by men who have watched them in their native haunts, and these are illustrated with the most beautiful and intimate photographs of them in a "home setting". "Movie" and "still" photography is becoming yearly easier for the amateur particularly that most fascinating hobby, flashlight traps. A camera is set up in the jungle alongside a game-path or over a tiger's kill and the animal is made to take its own portrait.

I seem to have drifted away from what I set out to tell you about—the Wild Life Conference at Delhi. The idea of holding this Conference originated with a small group of enthusiasts—sportsmen and nature-lovers—who were distressed to see the wholesale destruction of wild birds and animals that is going on in almost every part of India and at a steadily increasing rate. These men got in touch with as many others in all parts of India as they could and proposed a meeting to see what could be done. The proposal came to the ears of the Government of India who, realizing at once

the importance of the matter, not only offered its fullest support but undertook the whole organization of the Conference. About sixty representatives official and unofficial representing Provinces and Indian States attended the Conference, which lasted for three days.

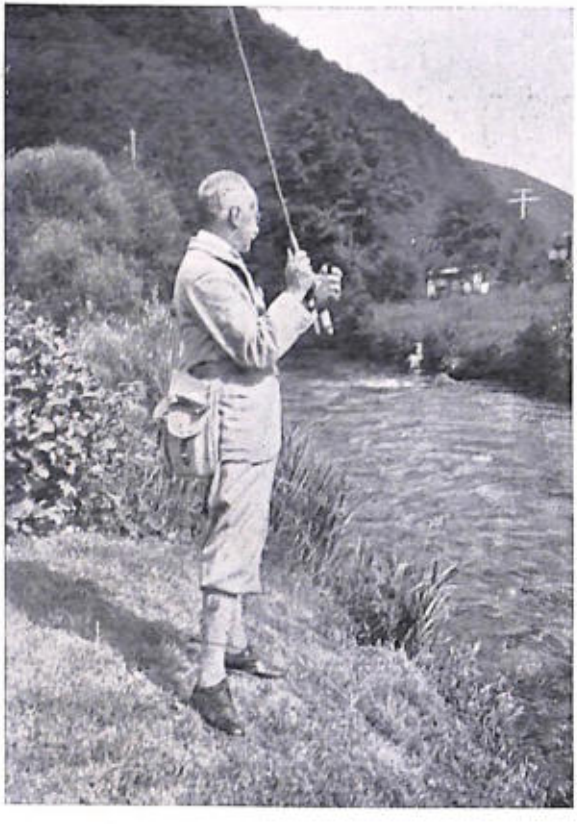
The Preservation of Wild Life will be a matter for Provinces and States under the new Constitution and not for the Central Government which will pass on the resolutions with their recommendations. It will than be up to Local Governments to show what they can do to remedy the present deplorable state of affairs, merely a question of making laws to control the destruction of wild birds and animals, or of laying out sanctuaries to protect them. This is an important part of the work but it can never be effective unless it has the backing of public opinion. The formation of local wild life societies and the appointment of Honorary Game Wardens from among good sportsmen of influence are two good lines to work on.

Fortunately the whole attitude of mankind towards Wild Life has changed and is changing rapidly with the spread of education. The extent to which the British schoolboy has changed within one generation was well put by one of the speakers at the Conference. Whereas, in his own schooldays, his interest in natural history had consisted mainly in birds-nesting, he found, when he went on leave that his son, armed with a pair of field glasses, really studied the habits of wild birds and animals. He thought that this was partly due to the excellent, and very cheap, natural-history books that boys in England can now get, and partly to the lectures on natural history with lantern slides that they are given at school.

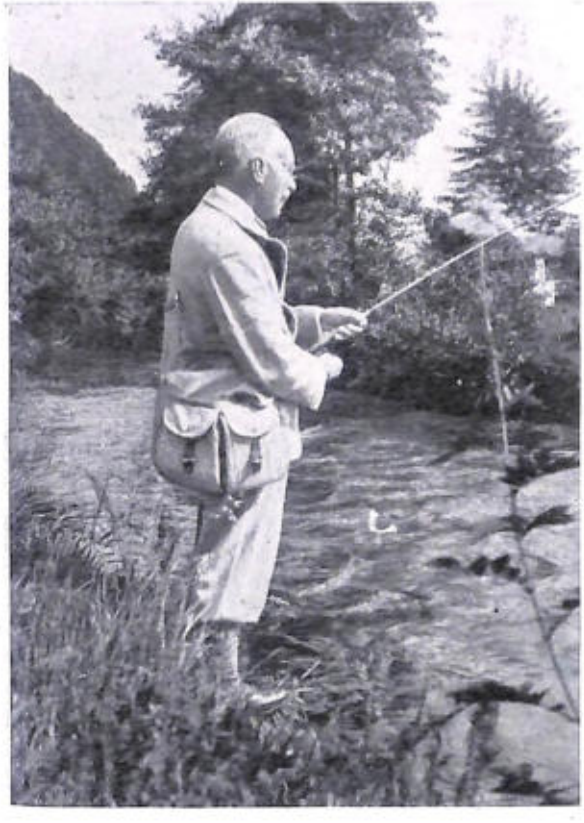
The Conference recommended the drawing up of an all India Convention for the preservation of wild life, on the lines of the African Convention of 1933. This would be a sort of agreement between the various States and Provinces to co-operate on certain definite lines. It also recommended that, if the proposed Asiatic Conference is held, India should be represented.

The most important recommendation was made that all Provinces and States should enact legislation for the preservation of the wild life in their territories. The old Wild Birds and Animals Preservation Act of 1912 has been practically a dead letter because offences under it are noncognizable. A policeman who finds a poacher selling deer's meat in the close season can neither arrest the man nor seize the meat. All that he can do is to lodge a complaint with the nearest magistrate who can issue a summons. If the poacher fails to obey the summons the magistrate can order his arrest but, by that time, the meat will have been sold and eaten and the poacher will have departed for his home—often outside British territory.

One of the most definite conclusions arrived at by the Conference was that the most effective way to stop the indiscriminate slaughter of wild animals is to prohibit, or at any rate regulate, the sale. All really serious destruction of wild life is brought about by those who kill for profit. Besides this the depredations of the most bloodthirsty poacher who kills for his own larder or to give to to his friends is a minor evil. The danger to our Bengal rhinoceros was the value of his horn. The scarcity of sambhur is due to the sale of meat. Apart from these larger animals the netting of duck, quail and snipe for supply alive, under conditions involving the most revolting cruelty, to large hotels and even to private houses is another example of the evil of commercialized shikar. It is safe to say that, if the trade in game could be checked, the effect would be apparent in the countryside to the most causal observer within a year or two. The Conference recommended that, if the sale of wild animals could not be prohibited entirely, it should be closely regulated. This proviso was not inserted out of any sympathy with the hotel proprietor who may wish to include game on his menu, still less to placate the gourmet who likes eating snipe but wishes to be spared the exertion of shooting them. It was inserted because it might be necessary to provide for certain backward tribes in wildest parts of the country who might be entirely subsistent on the capture and sale of some wild animal.



EXPECTATION.
WRITER FISHING.



REELING IN A HOOKED FISH.



NETTING THE CATCH.



REALIZATION

The Delhi Conference will have done some good if it has opened our eyes to what is happening to some of our wild birds and beasts and shown us what ought to be done to protect them. But the Conference was only in a position to recommend; it remains for local governments to put the recommendations into operation, with the help of public opinion which will surely be behind them in any sane efforts to protect our wild life. Before an Asiatic Conference if called together I hope that we shall be in position to show that India, and particularly Bengal, has done its share of the task.

Continental Fishing.

By

Col. H. S. Wood, I.M.S.

PART II.

(With four Half-tone Plates.)

(Continued from Vol. IX, page 106.)

The Rainbow Trout runs up to 3 lbs., but 8 and 9 pounders have been caught. These heavy fish are rare as they move down to deeper waters and larger rivers, and the authorities net them in the off season as they destroy such a number of their smaller brethren.

The season starts on the 1st April and ends at the end of September. If one wants large fish the later months are best, as the fish move up to spawn in the higher reaches and tributary streams. April is also a good month. I, usually visit Wildbad in June, July and August and have had all the sport I wanted. The Enz is subject to floods and the time for good sport is after the subsidence of the floods when the water has somewhat cleared. The Enz clears up very rapidly. One must be on the look out for snags and be prepared for one's cast to be fouled. The best hours for fishing are from 8 A.M. to mid-day and then from 3 to 7 P.M. The fish are generally on the rise in the evening and, at times, one gets a fish at every cast, provided one keeps well

away from the bank. I don't think the weather makes any difference. I have had good sport on a bright sunny day, when rain has been falling and on cloudy days; but I prefer a cloudy, over cast sky with bursts of sunshine. It is no use fishing when thunder is about or during a cold east wind. In July and August the horse-flies and midges are a nuisance. The horse flies are twice the size of the Indian ones and very voracious. One day, wearing shorts, I had 23 bites which I did not notice until I got home, hence it is always advisable to carry a small bottle of antifly preparation in one's bag. Messrs. Farlow, of the Haymarket, supply a very effective and pleasant preparation.

I have dissected a number of fish, caught in the Enz., and found the stomachs of all filled with small calcareous tubes, probably the home of some aquatic larva such as the caddis fly. When one gets these tubes from the stones they contain a yellowish caterpillar looking insect. I have seen the same larva in Italy where the grub is used for catching trout in the mountain streams.

On these occasions a curious thing has occurred while I was fishing. I have been reeling in the line with a fish on when a stoat has came out, within a few feet of me, and, after discovering what I was, by standing up on it hind legs, has darted into the bushes like a flash. I suppose the animal mistook the screech of the reel for the cry of some animal or bird in distress, I have called up a stoat by blowing on a blade of grass held between one's two thumbs, an old Indian shikari's dodge for calling up game, which I have used effectively in my younger days.

The Rainbow Trout give splendid sport. It is the joy of the fisherman to bear the screech of the reel, the dash of the fish up and down stream and leaps in the air, coming down with a slap on the surface of the water. It is well to keep your fish away from the sides, the fish when hooked always makes for the overhanging bank and, if they reach it, one is sure to be snagged; I lost several good fish in this way. When the Rainbow Trout leaps do not forget to lower the point of the rod.

What a lovely fish the Rainbow Trout is, looking, for all the world, as if made of mother-of-pearl. In the male fish this appearance is very marked about the head and gill plates. In some parts of the river, where the soil is yellow, due to iron, the lateral line of the fish assumes a deep orange hue.

Once, after a flood, I hooked a large Rainbow Trout which gave 5 or 6 leaps and then made for a heap of sticks which blocked the mouth of a tributary stream. He went right under, my rod almost bending in two. I was powerless to recover him as all my cast was under the sticks. Fortunately some hay-makers came to my rescue and the Trout was hauled out just like a rabbit out of a hole. I was, fortunately, using a fairly thick cast and, although much frayed, it held. It was a very strong fish and weighed $2\frac{3}{4}$ lbs.

A tip worth remembering is when you get a small Rainbow on do not be in a hurry to net him as his rushes will probably attract other larger fish to the flies. Many a time I have had a Rainbow on each of my three flies; this happened once four times in the one day. It is a difficult job landing them all single handed but see which is the largest and net him. Should you have two big ones on, go for the middle one first or the uppermost. Where there is a line of bushes, with trees here and there, making the usual casts impossible, a good plan is to force a passage through the bushes, regardless of nettles and brambles, make a side cast and run your line out for 40, 50 or 60 yards, you are sure to get a fish, either when letting out your line or reeling in; the difficulty is to keep your fish away from the bank. Never despair, even under the most trying circumstances. I have had to leave my rod when the cast got fouled and rush down stream to find the cast wound round a snag but the fish still there and promptly netted. My biggest Rainbow and Brown Trout have been obtained in this way as the fish cannot see one and the current carries the flies down just to the places where the fish are lying with their heads upstream.

My advice is not to use too small a fly when out fishing. A large fly, Lake Trout size, is seen more easily in the rapid, rough water of the Enz and the hold is better. Of course when dry fly fishing a small one must be used.

I am not going to give away the kinds of fly I use. One is a deadly fly for this river and the fisherman who told me about it bound me over to strict secrecy. Half the pleasure of fishing is to find out, for oneself, the flies for any particular water. For fishing in the Enz the ideal rod is a 9½ foot split cane one with no steel centre, weighing about 5½ ozs. I use an "Elf", split cane, supplied by Farlow of Haymarket and I do not wish for a better rod. I have lost faith in steel-centred rods except for Mahseer and large fish. Get the very best tackle in the way of line, casts and flies. Messrs. Hardy Bros. of Pall Mall are most reliable. A tapered, dressed line is best, about 50 yards spliced to 80 yards of silk line. Do not use too fine casts. Get a box of Hardy's "Cerolene" to prevent the line tacking in hot weather. A landing net is also necessary and get one that is slung at the back as, if at the side, it is apt to get in the way of bushes and be lost. When using a cast several times see that the hooks have not got blunt, filing will soon sharpen them. Do not forget to carry a disgorger and a "priest" to kill the fish. A fishing bag is handier than a basket and should have a removeable rubber lining which can be taken out and washed. For kit there is nothing better than a fairly light *kakhi* coloured Norfolk jacket with a pocket on the left hand side, plus fours of the same material and Canadian rubber trench boots with a strap at top to prevent them from sagging; waders are too hot. A small waterproof coat for rainy weather completes the outfit.

I will not bore my readers with accounts of daily catches they are only interesting to the fisherman himself. I have visited Wildbad now for three successive years and intend going there every year. In 1930 my total for four months was 387 Trout. In 1931 the total for two months was 257 and this year, also in two months, I caught 302. My total would have been higher, this year, had I not succumbed, for



Casting.
Calmbach Weir, River Enz.



A Day's Catch.
Upper Enz.



The Best of a Day's Catch.



A 3lb. Rainbow Trout.

some time, to a severe chill. One will expect to get many more Brown Trout than Rainbow. The so-called *Schwarz Forellen* is a shy fellow lying in the dark shade under overhanging banks. I do not think he is a distinct variety but that he gets his dark colour from his sombre surroundings. One does not usually catch him, as casting is difficult, but by keeping concealed and dropping a fly over him one, usually, meets with success. When landed he is a uniform greenish-black with very large bright rosette-shaped spots, but in a few hours he becomes pale or piebald, all the pigment having disappeared. His head is long. He is a very strong fish and plays well, sometimes jumping out of the water like a Rainbow Trout. He is considered, by the Germans, the best Trout for the table.

You should always carry your license with you as it is not unusual to have your bag examined, and your license scrutinized, by the watchers three or four times a day.

The hotel where I was staying is the Sommerberg. This hotel is situated high up amidst beautiful pine forests and an electric railway takes you down and up for the modest sum of 14 marks, available for a month. The hotel is of the first order, food excellent and the staff most obliging. The pension terms are 10 to 11 marks a day and a reduction is made for long stay. Herr Batzner is the proprietor. I would not advise anyone to stay in the town as it can be hot and very oppressive and on Sundays the place is pandemonium. Trains and *char à bancs* take one to the various villages situated along the fishing rights. Baden Baden is not very far away and all the roads are kept in beautiful order.

I forgot to mention that my biggest catch, for one day, was 42 Trout and my largest Trout, a Rainbow, caught in 1931 was 3 lbs. (*vide* photo).

In conclusion I should be very glad to give fishermen the benefit of my further advice, for what it is worth. My address is :—C/o. Lloyds Bank, Cox & Kings Branch, 6, Pall Mall, London.

For a keen fisherman wanting a pleasant holiday Wildbad is the ideal spot, so brother fishermen flock there and you will never regret it. Nerves, sleeplessness, malaria, etc., will all be banished.

I have heard that the fishing in Czecho-Slovakia in the river Kryko is splendid and I intend visiting that country some time. I would not advise any one to go Jugo-Slavia. I know some fishermen who went there and all of a sudden their licenses were cancelled, without any reason being given, which meant all the expense of the trip was for nothing. I am told that the inhabitants are very jealous and dislike the intrusion of foreigners for sporting purposes. As regards Norway, the fishing there has been overdone, the climate is atrocious and the charges beyond the ordinary man's purse. The fishing in Spain has deteriorated and the whole country is in a turmoil and travellers are put to a lot of inconvenience and the Customs officials too too officious. Fishing in Finland is excellent but a fishing trip costs about £100 a month and the mosquitos are terrible.

I forgot to say that all the German hotels add 10% for service which saves one all the trouble over tips when leaving. If you are not a medical man a small amount is charged as *Kurtax*. One can get the fishing license and ticket for the railway through the *concierge*. I have sent some photos, with this article, and hope they will interest the readers of the Journal.

If one wants a change the river Oos at Baden Baden affords fair fishing but the fish are not of any size. Ever since 1927 I have spent 9 months on the Continent, always on the look out for shikar or fishing. So my advice should be reliable.

Three New Species of Dragonfly from N.India.

(Order Odonata.)

Anax nigrolineatus sp. nov.

Anax bacchus Martin (nec *bacchus* Hagen), Cat. Coll. Selys (Aeschnines) fasc. xviii, pp. 22, 23 (1908).

Anax guttatus Series C Laidlaw, Rec. Ind. Mus. vol. xxii, pp. 82-86 (1921).

Anax fumosus Laidlaw, Proc. U. S. Nat. Mus. vol. lxii. p. 13 (1923).

Male. Abdomen 53 mm. Anal appendages 6 mm. Hindwing 48 mm.

Head :—labium bright or pale ochreous ; labrum ochreous bordered more or less broadly with black or blackish brown, this sometimes limited to the central portion; face and frons greenish yellow with a blackish brown T-shaped mark on upper surface of latter, with its stem more or less constricted at the middle but never quite detached from the basal expanded portion : eyes bluish green during life ; occiput black. Prothorax reddish brown with the anterior collar and a very narrow bordering laterally yellow ; thorax palest green with upper part of middorsal carina and the lateral sutures very finely black ; spots on axillaries and antealar sinus pale blue. Legs black, bases of anterior femora yellowish green or reddish brown. Wings hyaline ; pterostigma light to dark ochreous between black nervures, covering 2 to 3 cells ; membrane blackish brown ; 5 to 6 cells in discoidal triangle of fore-wing, 4 to 5 in the hind, 13 to 16 cells in anal-loop ; nodal index $\frac{10-18}{11-12} \mid \frac{19-10}{11-11}$ Abdomen black marked with bluish green or bluish spots as follows,— segment 1 green, its base finely black, more broadly so on dorsum ; segment 2 green for basal third, azure blue for the rest, the green area projecting dorsally and convexly into the blue, the two areas being separated by a narrow black convex line which is confluent with a narrow middorsal stripe extending from apical border and expanding on the jugal suture ; segment 3 with a broad prolongation of azure blue on to its sides as far as the jugal

suture, a postjugal subdorsal spot and an apical subdorsal spot; segments 4 to 7 with basal, jugal and apical subdorsal spots of blue; segment 8 with only an apical and postjugal spot; segment 9 with only apical spots which are repeated on a larger scale on segment 10 and nearly meet across dorsum at apical border. Anal appendages black or blackish brown, the middle of inferior paler; superiors closely similar to those of *Anax guttatus* but very much broader, at least half as much again at the middle breadth; inferior appendage relatively shorter, more tapered and with four spines above, two of which are situate at each corner at apex.

Female. Abdomen 49-51 mm. Hindwing 50 mm.

Resembles the male closely but the wings palely enfumed brownish yellow especially towards apices; abdominal markings more greenish yellow than bluish green or blue. Some specimens have the stem of the T-shaped marking on frons nearly severed from the transverse bar leaving a basal triangular spot somewhat like that seen in *A. imperator*. The blue on segment 2 restricted to dorsum and the jugal and apical spots on segments 3 to 7 are confluent, forming short subdorsal stripes. Segment 10 has two isolated quadrate dorsal yellow spots. Anal appendages similar to those of *A. imperator* but rather shorter, dark reddish brown.

Distribution.—Sikkim; Kurseong, Mangpu, Turzum and Nagri in the Darjeeling District. Type in my own collection, will be deposited in the British Museum. The late Dr. Ris was of opinion that this species was quite distinct but thought that it might possibly be a form of *A. fumosus*. The latter species extends from Java to the Celebes and is distinguished by having the stem of the T on frons very broad, never constricted as in the present species; the labrum of *fumosus* is not bordered with black and there are no black lines on the thorax. The present species is distinguished from *A. guttatus* by the abdominal markings bluish instead of orange and from *A. nigrofasciatus* (Japan and China) by the lines on thorax fine instead of

very broad. In some respects it resembles *A. imperator* but the latter has no T-shaped mark on upper surface of frons. (It is to be noted here that the latter species has been reported from the N. W. Himalayas, a new record for the species and a new one to the Indian fauna).

Foot-note.—"Jugal suture" is the transverse ridge which is seen in many Anisopterous dragonflies on the dorsum of the segments nearest thorax. Markings on the thorax side of these sutures are known as "antejugal spots", and on the reverse as "post jugal spots").

Periaeschna unifasciata sp. nov.

Male. Abdomen 57 mm. Hindwing 47 mm.

Head : labium bright ochreous ; labrum duller ochreous ; anteclypeus brownish ; rest of face and frons olivaceous brown, unmarked with darker brown or black ; vesicle and occiput reddish brown ; eyes brown. Prothorax ochreous, posterior lobe deeply emarginate at middle, fringed with long golden hairs. Thorax very dark reddish brown as far lateral as the posterior suture, metepimeron beyond this level light reddish brown or ochreous. Two narrow antehumeral stripes on dorsum grass-green and with upper ends squared and almost meeting antealar sinus ; laterally a broader, similarly coloured stripe traversing the middle of mesepimeron and narrowly bordered in front and behind with black ; beneath reddish brown. Legs bright reddish brown. Wings hyaline ; 2 rows of cells between the forking of *IRiii* but occasional cells interposed between these two rows ; 12 cells in anal-loop ; 3 to 4 cells in anal triangle ; nodal index $\frac{23-23}{23-18} \mid \frac{25-22}{17-26}$ 6 median nervures in forewing, 5 in the hind ; 8 cubital nervures in forewing, 7 in the hind ; 1 or 2 rows of cells between the origins or *Cuii* and *IA* in hindwing. Abdomen dark reddish brown to black on dorsum marked with yellow or green as follows,—segment 1 unmarked ; segment 2 with a large spot on each side. a short middorsal line extending from base to jugal suture, a pair of linear lunules at jugal suture and a pair of apical lunules confluent broadly over dorsum ; segments 3 to 7 with linear spots at jugum and a pair of apical green lunules ; segments 8 and 9 with mid-dorsal apical triangular spot extending basally along

middorsal carina, segment 8 with a vestige of the jugal spots ; segment 10 with a small round subdorsal subbasal spot on each side. Anal appendages black ; superiors narrow and cylindrical at basal third, lanceolate and flattened for apical two thirds, strongly ribbed above, apex very obtuse but with a minute point on outer side ; more than twice the length of segment 10 ; inferior appendage nearly three fourths the length of superiors, narrowly triangular with apex curled gently upwards.

Female. Abdomen 57 mm. Hindwing 51 mm.

A much more robust insect than the male, thorax very bulky and abdomen very swollen at base, markedly compressed from segment 8 to 10 where the very large ovipositor broadens the segment dorso-ventrally ; wings also much broader and tinted palely and evenly with brown, whilst the bases are coloured bright amber to as far as halfway to arc ; pterostigma paler brown, covering 4 to 5 cells ; 2 to 3 rows of cells between forking of *IRiii* and short lengths of 2 rows of cells between *IRiii* and *Rspl* in the hindwings only ; 14 to 15 cells in anal loop ; both median and cubital spaces with reticulated nervures forming a partial network ; other details similar to those of male. Colour and markings similar to male but abdomen broadly ochreous along the sides of segments 1 to 9 ; segment 8 with a small round subdorsal subapical yellow spot ; segment 9 with a large basolateral spot on each side. Anal appendages black, shortly conical ; ovipositor robust but not extending beyond end of abdomen ; genital dentigerous plate as for genus.

Distribution.—Darjeeling District, Bengal. I have a pair which I took in May at Mangpu, the male the type. This species is easily determined from all others by the presence of only one stripe on the sides of thorax in place of the conventional pair of stripes.

Palpopleura sexmaculata octomaculata subsp. nov.

Male. Abdomen 12 mm. Hindwing 14 mm.

This subspecies differs from *P. sexmaculata sexmaculata* by its smaller size, by the wings, especially the hind, being

much narrower and of even width throughout and coloured similarly in the two sexes, those of the male being marked similar to those of the female of *sexmaculata sexmaculata*. The dorsum of thorax reddish brown with the middorsal carina and a narrow bordering to same yellow ; humeral suture black above on the dorsal side and then continued very finely downwards. Abdomen pruinosed blue and with the sides of segments 1 to 3 and base of 4 yellow ; a small baso-lateral yellow spot also on segments 5 to 7 which may be extended in some specimens as a narrow lateral stripe as far as apical end of segments ; segment 8 with a subdorsal longitudinal spot on each side ; segment 10 and bases of anal appendages yellow but the sides and extreme base of segment black. Wings with basal black marking more extensive than in the female of *sexmaculata sexmaculata*, this extending in fore-wing nearly to wing border in some specimens and in the hindwing to as far as the tornal angle of base including the basal portion of anal loop. Beneath the proximal end of pterostigma in the male, a very large triangular opaque black spot extending transversely across the hindwing for two thirds its breadth. Nodal spot in forewing covering 2 cells and a vestige of this spot present also in the hindwing. Amber tinting of hindwing very intense and extending almost up to apex of wing.

Distribution.—A number of males from Sylhet, Assam, characterized by their extremely small size and gynomorphic colouring. They are also distinguished from the males of *P. sexmaculata sexmaculata* by the presence of a preapical subpterostigmal opaque spot in the hindwings. This spot is occasionally found in the females of the latter species but is quite unknown in the male. Type in my own collection.

F. C. FRASER, Lt. Col. I.M.S., RETD, F.R.E.S.
Bournemouth, Hampshire.

The Purple Thrush (*Cochoa purpurea*).

Mr. W. H. Matthews of Namring T.E., kindly sent in a skin of this uncommon or very local bird and, with it, the following interesting note.

"I send you the skin of a male *Cochoa purpurea*. This was one of a pair obtained in the coolie lines feeding on the berry of the "*Daling Patay*" tree.

Both birds called morning and evening—a long whistle like the Hill Partridge (*A. torqueola*) descending the scale on the last note, reminiscent of the lora in the rains. When the male was shot the female called all the afternoon till six P.M.

If I had known *Cochoa purpurea* was about I would have tried to find their nest, but I sent the shikari to get an immature Plaintive Cuckoo, in chestnut plumage, for the Museum and he produced the *Cochoa* !" This note of Mr. Matthews is especially interesting on account of the birds having been found actually in the coolie lines, it has always been represented as essentially a forest bird, also on account of his description of the bird's note which differs from that recorded by Stuart Baker.

Editor.

REVIEW.

Popular Handbook of Indian Birds. By Hugh Whistler. Revised and Enlarged Edition 1935. Published by Gurney and Jackson. Price 15 shillings.

It is with the greatest pleasure that we announce the publication of the 2nd Edition of this, deservedly, popular book. Mr. Whistler's name is sufficient guarantee as to the reliability and correctness of his observations as is Mr. Gronvolds' for the beautiful illustrations.

The 1st Edition was published in 1928 and so popular was it that it was exhausted within the short period of 5 years. It is a work which filled a long felt want as, although several other popular books on birds, one with coloured plates, had been published, these were local or only described a small number of common species. Mr. Whistler's work covers the whole of the avifauna of this country, so far as the commoner and more striking birds are concerned. We anticipate that this 2nd edition will be exhausted in even a shorter period than the 1st one.

The Edition under review consists of 495 pages of letterpress, 22 full page plates (ninety-five figures), of which 5 are coloured, and 96 figures in the text as compared with 423 pages of letterpress, 17 full page plates (eighty-one figures) of which 4 are coloured and 85 figures in the text of the 1st Edition. Also, in the 1st Edition, 250 birds were described whereas in this one 275 have been fully described and over 230 others have been sufficiently described to be recognizable and their distribution given so that more than double the number of the 1st edition are found in this one. This is a very great advancement and covers, practically, all the birds that are likely to be come across by anyone in any part of India. The letterpress has also been thoroughly revised and brought up to date.

There was a certain amount of criticism of the 1st Edition as a number of birds which were common locally or some which covered a very large area were omitted ; also that N. W. Himalayan and Punjab species predominated too

largely, but this criticism cannot be said of the 2nd Edition as all areas have been equally dealt with. Possibly a few birds may have been omitted such as the Yellow-naped Ixulus which is common in gardens in our Hill station but these will be very few indeed and, in a book covering such a vast area as India, it is impossible to make a selection with which everybody will agree but we consider the one made, in the present volume, is as good as anyone could make. It may be safely said that no matter in what part of India one may be stationed one can turn to this volume and not only find there what the common birds, in one's particular locality are, but also most interesting information about their habits etc.

The descriptions are concise and correct and no one should have any difficulty in recognizing the birds they observe. There is nothing to puzzle even those who know nothing about ornithology and the advanced student will also find much that is if interest to him.

The illustrations are beautifully executed by the well known bird artist Mr. Gronvold and the only figure which we consider not up to his standard is the one of the Red-vented Bulbul in the frontispiece; the crest is shown too round, at any rate for our Bengal birds.

The printing and general get-up of the book are excellent and quite up to the high standard of the firm which publishes it.

We strongly advise all who are interested in birds, either casually or deeply, to invest in this book the price of which is within every ones reach. It is real good value for the money.

Editor.

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43	HART, F. J. A. [I.F.S.]	... England.
44	HEPBURN, G. ...	... Matelli P. O.
45	HEWITT, R. S. ...	... Rungli Rungliot P. O.
46	HODGE, W. E. [I.F.S.]	... Kalimpong P. O,
47	HOGG, MRS. ...	... Darjeeling P. O.
48	HOMFRAY, C. K. [I.E.S.]	... Darjeeling P. O.
49	HOOPER, C. T. J. ...	... Delhi.

50	JALDACCA SHOOTING AND FISHING ASSOCIATION, The Hon. Secretary	Matelli P. O.
51	JOHNSTONE, Ian	Hantupara P. O.
52	JONES, MRS.	Bokakhat P. O.
53	KEATINGE, H. A.	Chittagong.
53	KERR, W. J. [P.W.D.] ...	England.
54	KIRBY, R. R.	Tindharia P. O.
55	LAW, DR. SATYA CHURN, [M.A., B.L. ETC.,] ...	Calcutta.
56	LISTER. R. S.	Pashok P. O.
57	LLOYD, E. R.	Garopara P. O.
58	LLOYD, R. A.	Kalimpong P. O.
59	LORETO CONVENT, MOTHER SUPERIOR	Darjeeling P. O.
60	MACALPINE, R. I. [I.F.S.] ...	Chittagong P. O.
61	MACDONALD, A. ST. J. ...	Ryam P. O.
62	MACDONALD, MR. E. M. ...	Kumbhir P. O.
63	MACKRELL, G.	Calcutta.
64	MACPHERSON, J. J. ...	Gairkhatta P. O.
65	MARR, A.	Calcutta.
66	MARTIN, O. M. [I.C.S.] ...	Calcutta.
67	MATTHEWS, W. H. ...	Rungli Rungliot P. O.
68	MCINTOSH GEO.	Hantupara P. O.
69	MCKEAN. M. G.	Rungli Rungliot P. O.
70	MILBURNE, W.	Barjuli P. O.
71	MILNE, J.	Binnaguri P. O.
72	MODDER, E. A. C. (I.F.S.) ...	Dow Hill P. O.
73	MORGAN, R. W. D. ...	Calcutta P. O.
74	MULRONEY, J. T.	Kurseong P. O.
75	NATH, J. C. [I.F.S.] ...	Khulna P. O.
76	O'BRIEN, G. W. ...	Mahanadi P. O.
77	O. DONEL, H. V.	Binnaguri P. O.
78	OSBORNE, P. V.	England.
79	OSBORNE, D. G. SMYTH ...	Darjeeling P. O.
80	Pal. N. [I.F.S.]	Darjeeling P. O.
81	PARNELL, A. T.	Golaghat P. O.
82	PATERSON, E. A.	Calcutta P. O.
83	PETTIFOR, J. B. R. ...	Kalchini P. O.

84	PULLAN, A. V. ...	...	Hatipotha P. O.
85	RAO. V. S. [I.F.S.]...	...	Gairkhatta P. O.
86	REID, THE HON. R. N. [C.I E., I.C.S.)	...	Calcutta P. O.
87	RICHES, F. C. ...	...	Matelli P. O.
88	RICKETTS, A. C. ...	...	Gangaram P. O.
89	RIDDELL, R. H. ...	...	Chandkhira P. O.
90	ROBERTSON, F. W. [I.C.S.]	...	Jalpaiguri P. O.
91	ROLFE, C. H. ...	...	Nagraakatta P. O.
92	SEN, S. C. ...	...	Mangpu P. O.
93	SHAW, G. E. ...	...	England.
94	SHEBBEARE, E. O. [I.F.S.]	...	Calcutta P. O.
95	SHEPHERD, F. R. ...	...	Fagu P. O.
96	SHILLINGFORD, C. A.	...	England.
97	SLATTER, MRS. ...	...	Kurseong P. O.
98	SMITH, S. BRABANT	...	England.
99	SMITH, W. K. LANGDALE	...	Rungli Rungliot P. O.
100	STEAD, F. C. ...	...	Chandkhira P. O.
101	STEVENS, H. ...	...	England.
102	ST. JOSEPH'S COLLEGE, THE RECTOR ...	...	North Point P. O.
103	TERRILL, F. J. A.	...	Nagri Spur P. O.
104	TIETKENS, A. J. H.	...	Ghum P. O.
105	TOWNEND. MRS.	...	Calcutta P. O.
106	TRAINING COLLEGE, DOW HILL		Dow Hill P. O.
107	TRAVERS, SIR W. L. [KT., C.I.E., O.B.E.]	...	Baradighi P. O.
108	TRENCH, G. CHENEVIX	...	Udaipur.
109	TURNER, J. S. ...	...	Kalchini, P. O.
110	TYNDALE, H. E. ...	...	Kalchini P. O.
111	VAN INGEN, J. ...	...	Mysore.
112	WAIGHT, MRS. H. G.	...	Midnapore P. O.
113	WALLER, R. G.	...	Calcutta P. O.
114	WAY, E. SAMPEON	...	Darjeeling P. O.
115	WEBB, E. G. L.	...	Binnaguri P. O.
116	WEBB, LT.-COL. G. A. (V. D.)		Mirik P. O.
117	WEBB, N, G. ...	...	Hasimara P. O.
118	WERNICKE, F. PAGE	...	Darjeeling P. O.
119	WHISTLER, HUGH	...	England.

120	WIBMER, M. D.	...	Matelli P. O.
121	WIBMER P. ...	...	Matelli P. O.
122	WILLIAMSON, F. [I.C.S.]	...	Gangtok P. O.
123	WOOD, COL. H. S. [I.M.S]	...	England.
124	WOOD, A. E. F. [I.P,]	...	Bankura P. O.
125	WRENICK, C.	...	Darjeeling P. O.
126	WYLIE, LT.-COL. M.	...	Gorakhpur P. O.
127	YOUNG, J. T.	...	Newlands P. O.

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MALES OF

On top CINNYRIS ASIATICA ASIATICA (Lath.)

The Indian Purple Sunbird

On top left ÆTHOPYGA SIPARAJA SEHERIÆ (TICKELL)

The Indian Yellow-backed Sunbird

On top right ÆTHOPYGA IGNICAUDA IGNICAUDA (HODGS.)

The Fire-tailed Yellow-backed Sunbird

In Centre ÆTHOPYGA NIPALENSIS NIPALENSIS (HODGS.)

The Nepal Yellow-backed Sunbird

On bottom left ÆTHOPYGA SATURATA SATURATA (HODGS.)

The Black-breasted Sunbird

On bottom right ÆTHOPYGA GOULDIÆ GOULDIÆ (VIGORS)

Mrs. Gould's Sunbird

JOURNAL

OF THE

DARJEELING NATURAL HISTORY SOCIETY.

Vol. X.—No. 2.

The Sunbirds and Spider-Hunters of our area.

BY

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

(*With a Coloured plate.*)

The Sunbirds are known as Honey-suckers to many Europeans in India; they are also, sometimes, called Humming-birds, but this is a misnomer. The Humming-birds are entirely confined to the New World, being, practically, found all over it. They belong to quite a different Order being Picarian and closely allied to the Swifts, whereas the Sunbirds are Passerine a member of that huge order *Passeres*. The habits of the Humming-birds differ greatly from those of the Sunbirds, the former constantly hovering over flowers and the motion of their wings in flight is so rapid, that all one sees is, according to Professor Newton, "a thin grey film bounded above and below by fine black threads in the form of St. Andrews cross—the effect on the observer's retina of the instantaneous reversal of the motion of the wing at each beat." The Sunbirds can also hover but only for a very short time and procure their food by perching on the twigs near the flowers and so reaching them.

Most of the males of the Sunbirds have metallic tints and purple, scarlet, yellow, amethyst, green etc. The hens are soberly clad in dull green or yellow.

The Spider-Hunters have the sexes alike and are green and yellow in colour, some being streaked with black.

The Sunbirds and Spider-Hunters belong to the family *Nectariniidæ*. They have long slender bills, more or less curved, with the terminal portion of their edges serrated, and quasi-tubular tongues.

Some are common garden birds frequenting flowering shrubs and trees, others are found in forests, dense or thin, and they range from plains level up to 12,000 feet elevation, in the hills.

The family is divided into two sub-families, one the *Nectariniinæ*, consisting of the Sunbirds, in which the sexes differ, the males, having some portion of their plumage metallic, the other, the *Arachnotherinæ*, contains the Spider-Hunters, in which the sexes are alike and none of the plumage is metallic.

The first sub-family has four genera, only two of which are represented in our area. *Æthopyga*, in which the males have lengthened central tail-feathers and yellow rumps and the females green underneath and *Leptocoma*, some prefer the name *Cinnyris*, in which both sexes have rounded tails, the males have no yellow rumps and the females have the lower plumage yellow.

We will first take the genus *Æthopyga*. In this genus the bill is slender and well curved, the rump yellow and the central tail-feathers produced beyond the others and narrow on the terminal halves. There are 17 species and subspecies found in India, of which only 6 occur with us.

The following key, adapted from the *Fauna of British India* volumes will enable both sexes of these birds to be determined. The differences between Mrs. Gould's Sunbird and the Manipur Yellow-backed Sunbird are given in the text.

Males.

A. Chin and throat crimson ... The Indian Yellow-backed Sunbird.

B. Chin and throat dark, not crimson.

a. Middle tail-feathers red ... The Fire-tailed Yellow-backed Sunbird.

b. Middle tail-feathers, green, violet or blue.

a'. Dark portions of crown not extending to nape.

a''. Breast mostly yellow streaked with scarlet... Mrs. Gould's Sunbird.

b'. Dark portion of crown extending to hind-neck.

b''. Breast black ... The Black-breasted Sunbird.

c''. Breast yellow, streaked scarlet ... The Nepal Yellow-backed Sunbird.

Females.

C. Chin and throat green like rest of lower plumage.

c. No yellow band across rump.

c'. Tips of tail-feathers large, white and well-defined.

d''. Under tail-coverts greyish ... The Indian Yellow-backed Sunbird.

e''. Under tail-coverts yellowish ... The Nepal Yellow-backed Sunbird.

d'. Tips of tail-feathers pale and obsolete ... The Fire-tailed Yellow-backed Sunbrid.

d. A yellow band across rump.

e'. Bill from gape to tip ·65″ or under 17 mm ... Mrs. Gould's Sunbird.

f'. Bill from gape to tip ·8″ or over 17mm ... The Black-breasted Sunbird.

1. The Indian Yellow-backed Sunbird.

Æthopyga siparaja scheriæ (Tickell).

Field identification.—A tiny bird found both in the plains and the hills in which the males show a lot of crimson and the hens are green. Seen in gardens and forests, usually where there are flowers.

Description.—There is no necessity to give a full description of the adult male as it is shown in the coloured plate but as only a small part of the lower plumage is seen we mention that the chin, throat and breast are crimson and below that greyish-green, yellower in some individuals.

It measures in length about 6 inches, wing 2·2 and tail 2·7 inches; the centre tail-feathers project about an inch beyond the next pair.

The *young male* resembles the female at first and then the crimson appears on the chin and throat. Ticehurst says the "juvenile male has the throat and chin brick pink."

The *female* is olive-green above tinged with yellow on the rump and the lower plumage yellow-green; the central tail-feathers are greenish and the others ashy-black, the lateral ones broadly tipped with dull white.

Length about 5 inches, wing 2 and tail 1·8 inches; the central tail-feathers being ·75 inches longer than the outermost ones. According to Ticehurst the juvenile female is greyer, not so yellow on the underparts.

Distribution. Inside our area.—All over the Duars up to 6,000 feet in the hills where Osmaston obtained it. We have no specimens from above 3,860 feet. Stevens in his "*Birds of the Sikkim Himalayas*" says :—"Recorded for the Himalayas up to 7000" in summer. This elevation is entirely erroneous for the Sikkim Himalayas. *Confined to low elevations only.* Entirely absent from the valleys of the foot-hills in the west which do not support a plains fauna."

Outside our area :—Stuart Baker gives the distribution as "The foot hills of the Himalayas from the Kuman Terai to the extreme East of Assam and Eastern Bengal..... The present race, *seheriæ*, was originally taken by Tickell in Seheria, Borabhum; Ball saw an *Æthopyga*, almost certainly this species, in Singhbhum and D' Abreu records a male from Laugher, 1,933 feet, in the district of Balaghat, Central Provinces." Later in his "*Nidification of Birds of the Indian Empire*" "he writes :—"since the 'Fauna' was written considerable additions to our knowledge of the

distribution of this Sunbird have been made. It extends through the outer hills and plains at their feet from Sikkim to Eastern Assam. It occurs in the Chin Hills, excluding the range of Mt. Victoria and has been found breeding on the Yu River, Upper Chindwin.

Osmaston obtained it at 6,000 feet in Darjiling, while Tytler found nests at 1,000 higher still in the ranges of the Naga Hills."

Habits etc:—These beautiful little birds frequent forest, both dense and thin, also gardens etc. During the breeding season they keep mostly to the forests. They may generally be seen where there are shrubs or trees in flower or else clinging to the stems of garden flowers and inserting their bills in them, often reaching out or twisting their bodies or necks, to reach the inside of the flowers, in their search for nectar and minute insects. Whistler writing on the "*Birds of the Kangra District*" says that they "fed from the flowers of a red gladiolus, yellow iris, and a weed with a small red flower. The iris flowers were pierced by the bird with a tiny hole at the base, the mouth of the flower being disregarded." They will also hover in front of a flower while feeding from it, after the manner of a Humming bird, but never for any length of time. Where there are no flowers they may be seen hunting for insects under the leaves of trees and bushes. Stuart Baker found them feeding on small spiders.

They are very sociable little birds but the various members of the parties do not always agree. Stuart Baker remarks :—The note is a sharp trill and is uttered on the wing; males when feeding in company, as they often do, constantly make this call to one another but they are very pugnacious, as well as gregarious, and their social clubs often break up in disorder over some trivial dispute. They feed most often on flowers and bushes near the ground but I have seen them feeding in the flowers of the cotton-tree over 100 feet up."

The breeding season according to Stuart Baker is "May and June, while a few birds lay in July and, on the other

hand, in Nepal and Sikkim in the higher ranges over 5,000 feet many lay in April." To this may be added August as Möller found a nest during that month.

The late A. M. Primrose and myself took many nests of this Sunbird in the Goma Reserved Forests in Goalpara, Assam, during May 1905 to 1906. All the nests were situated on the banks of small streams, mostly under over hanging portions in which the lower parts had been scoured out during the Rains, they are there attached to the roots of bushes etc. which are hanging loose, the earth having been washed away from them; some were on the twigs of the bushes themselves which overhung the stream, and, according to Baker, sometimes nests are attached to the fronds of brackens or to a spray of bamboo. The forest in which they were found, was dense evergreen, very gloomy, hot, steamy and malarious. I was knocked out by the most virulent type of malaria which nearly ended me. Many nests were found on the same stream.

Mr. O. Möller took the nest of this bird in Sikkim and wrote as follows:—This beautiful Honey-Sucker is very common here, but I have only succeeded in finding 4 nests of it, 3 of which were found in May, and one in August; the nest is always suspended from or close to the end of a twig, 3 to 4 feet from the ground; the number of eggs is 2 or 3."

Hume describes the nest as "an elegant hanging purse of an elongated pear-shape suspended from the petiole of a large leaf, 6 or 7 inches in length and 2·5 inches in external diameter, with an oval entrance on one side from 2 to 2·5 inches from the bottom, from 1·78 to 2 inches high by 1·0 to 1·25 broad. The interior cavity, below the edge of the opening, is about 1·5 inches deep and a little less in diameter.

"The external portion of the nest is composed entirely of fine black rootlets loosely felted with grass, in which a few dry blades of grass have been incorporated longitudinally as if to strengthen and stiffen the structure. Interiorly the entire nest is lined with extremely fine pale brown

flower-stems of flowering-grasses, and the whole bottom of the cavity is thickly filled with fine silky seed-down."

I have no longer any of the nests which Primrose and myself took but Stuart Baker writing in his "*Nidification*" says :—The nests taken in Assam by Coltart, Inglis, Primrose and myself were similar in shape to those described above but were made in great part of cotton-down held together with fine roots and mixed with moss, grass-seed ends and scraps of grass-stem, the porch over the entrance being made principally of roots and the lining of *Bombax* seed-down. In some nests oddments of all kinds were added as external decorations ; sometimes the nest looked like a mass of fine roots, at other times like a mass of wind-blown cobwebs caught on a branch or among the roots hanging from the bank."

They lay 2 or 3 eggs varying much in colour and character, Stuart Baker gives the following types from his collection.

"(1) Pure white ground, speckled sparsely with dark brown, the specks a little more numerous at the larger end.

"(2) White, lightly blotched with dark brown except at the larger ends, which have broad zones of dark brown, the marks almost coalescing.

"(3) Pale cream, minutely flecked all over with pale reddish.

"(4) Cream, profusely marked with brickred, reddish-brown or brown, the markings even more numerous at the large end, where they form indistinct caps or rings.

"In shape the eggs are broad, blunt ovals, occasionally rather longer and pointed.

"The texture is very fine but not very close, the surface is dull and the shell very fragile.

"Thirty-one eggs average 15·1 × 11·4 mm."

Hume gives the size of 4 eggs, in inches, as from 0·57 to 0·6 in length by 0·45 to 0·47 in breadth.

These two beautiful little Cuckoos, the Violet *(Chalcites xanthorhynchus)* and the Emerald *(Chalcites maculatus maculatus)* Cuckoos parasatize these Sunbirds. We must have taken over twenty nests of these Sunbirds and in some seven or eight of them were found eggs of one or other of these Cuckoos. The Violet Cuckoo was common in the Goma Reserved Forest and we found them in the vicinity of where we took some of our Sunbirds eggs and *no* Emerald Cuckoos were ever seen there, this is rather negative evidence but nevertheless there is *no* doubt in *my* mind as to which of these Cuckoos some of our eggs belonged. This is coroborated by Stuart Baker in his "*Nidification*" when writing on the Violet Cuckoo. He writes :—"So far as I know no oviduct egg of this species has ever been obtained, but Inglis, Primrose, Hole. Coltart and myself have taken many eggs which are exactly like those laid by the Emerald Cuckoo, but which have been taken in ravines and other areas in which no Emerald Cuckoo was found and only the present species seen. I have no doubt that the identification of these eggs is correct." I may add that not only was the Violet Cuckoo *seen* but it was *secured*. The evidence as to the Emerald Cuckoo laying in the nests of these Sunbirds is perhaps on better grounds as Primrose actually took a young Emerald Cuckoo, when nearly ready to fly, from the nest of these Sunbirds and sent it to Stuart Baker who confirmed the identification.

2. The Nepal Fire-tailed Yellow-backed Sunbird. *Æthopyga ignicauda ignicduda* (Hodgs.)

Field identification :—A small bird found from 2,000 feet in winter up to 12,000 feet in summer. The adult males, with their very long tails, are most conspicuous as they feed from the flowers of rhododendrons or other plants. The hens are ashy-green with greenish-yellow abdomens.

Description:—We need only describe the young males and females as the adult male is shown in the coloured plate.

Males measure in length about 8 inches ; wing 2·3 and tail 5 inches ; the central feathers of the latter projecting

2·7 inches beyond the next pair. We have none with such a length of tail, our longest measuring about 4·65 inches or 118 mm.

Ticehurst writes *(Journel Bombay Natural History Society Vol. XXXII).* "There is not the slightest doubt that this species.....has a dull winter dress. It is green like the female but the underparts are brighter yellow, and often show some odd orange feathers. Tail longer than in the female, outer webs red, centrals not prolonged more than half an inch beyond the rest, otherwise tail as in summer; tail coverts scarlet, rump yellow. Many specimens in this dress in the British Museum are labelled females but by measurements alone they are sexed wrongly. Moult out of this dress starts in February and lasts till April the body plumage, central tail or whole tail, but apparently not the wings, are moulted to the full dress. After breeding the males moult again and assume the above dress (specimens in old full dress with the new green feathers 'in pin' examined).

The *Young male* resembles the female but in all our specimens the upper tail-coverts are orange-red or crimson instead of being green margined with greenish-yellow as in the female. The sequence of assuming adult plumage does not appear to be the same in all birds. Out of seven young males examined, two, dated 8th December 1931 and 16th November 1932, resemble females, except for the more intense yellow on the rump, the crimson on the upper tail-coverts, the deeper red on the tail and rather deeper yellow on the lower plumage but the latter is somewhat mixed with greenish yellow; in three others, dated 20th November 1924, 9th November 1931 and 10th November 1933, the yellow on the lower plumage is much brighter and, in the latter one, the tail is much longer; one specimen collected on the 30th November 1926 has the breast suffused with orange red and some crimson is appearing on it; in this specimen the tail coverts are only orange-red and not the rich crimson of the others, and the tail is more like that of the hen; another dated 23rd January 1920 has less yellow on the lower plumage and no sign of orange-red on the breast

but there are a few, scattered, crimson feathers on the hind-neck and sides of the neck ; the tail is only margined with very dull red. A moulting bird, dated 26th August 1925 has, more or less, assumed the colour of the breast of the adult and the crimson on the back and hind-neck are fairly advanced, a small patch of metallic feathers shows at the base of the crown and some scattered ones on the chin and throat.

The *female* is ashy-green above and on the chin throat and breast, changing to greenish-yellow on the abdomen and lower flanks ; the rump and upper tail-coverts are margined with greenish-yellow and the central tail-feathers are blackish, edged with rufescent-brown and obsoletely tipped paler, the others more or less rufescent-brown and obsoletely tipped paler.

She measures about 5 inches ; wing 2·2 and tail 1·6 inches.

Distribution in our area :—From 2,000 feet, where we came across it at Buxa, in the Duars, and Stevens at Nurbong, in the Hills, in winter, up to 12,000 feet in the Hills in summer.

Outside our area :—Stuart Baker gives the distribution outside our area as :—

"Nepal, Assam, Cachar, Sylhet, Manipur and Tippera in Eastern Bengal. West it extends to Garhwal and Kuman".

Habits etc. :—This lovely Sunbird inhabits, during the summer, the highest regions. We have found them at Phalut, 11,800 feet elevation, at the beginning of April, haunting the lilac flowered rhododendrons for honey and probably, minute insects, when the whole country was under snow. It is a wonderful sight watching a party of these beautiful birds amongst the rhododendrons, silver firs and birch. Stuart Baker found them in oak or mixed oak and rhododendron jungle in Assam and we have found them in the same in Darjeeling. Stevens came across it at Dejoo, at the foot-hills, in Assam, in winter, searching the flowers of the tea-bushes in company with White-eyes and Spider-Hunters.

It is more a bird of the forests but enters gardens too, specially those which are wooded. We saw numbers there, in Darjeeling in the spring and also in early November and December.

Stevens found them as low down as Nurbong, 2000 feet, on the 20th February and in March, but though a few may be as low as that then, most will be found higher up from 5,300 feet upwards. In November we have secured them between 4,000 and 6,500 feet. In the winter they were obtained as low as Buxa, 2,000 feet, in the Duars but all do not come down as low, even in the cold weather, as we have others collected at 6,700 feet in early December and at 5,000 feet on the 23rd January.

The food of this bird is the same as that of other Sun-birds, the honey from flowers and, probably, tiny insects.

With regard to the breeding of this handsome Sunbrid, B. B. Osmaston writes in the *Journal of the Bombay Natural History Society, Vol. XV., pages 513 and 514*:—This beautiful sunbird affects higher altitudes than any other species with which I am acquainted. It is found in summer in the forests of silver fir and rhododendron between 10 and 12,000 feet, descending in winter to 6,000 feet or even lower. In the spring and early summer it feeds largely on the honey secreted by the flowers of the various species of rhododendrons found in these hills.....On the 27th May while descending a steep wooded slope at an elevation of 11,000 feet through a forest of silver fir, brich and rhododendron, with an under growth of dwarf bamboo (*Arundinaria aristata*) I came on the nest of this species suspended about 3 feet above the ground from a lateral branchlet of a bamboo which had been incorporated into the nest. It is oval in shape, 6" high by 4" in diameter, with a small round hole $1\frac{1}{4}$" across near the top. It is composed externally of moss interwoven with black rhizomorph. Next comes a layer of thin pink papery rhododendron bark followed by a lining of fine grass flowers and feathers.

The eggs, 2 in number, are long ovals, white, mottled and freckled uniformly all over, with a faint dark shade of brown.

They measure ·74″ × ·50″ and ·75″ × ·50″ respectively.

Whymper took it on the Pindari glacier at 12,000 feet in Birch forest. His nest and eggs are similar to those taken by Osmaston. Stuart Baker found this bird breeding in the highest hills South of the Brahmaputra in April and May. He writes in his "*Nidification*" :—

"The nests taken by myself were all built on the stems of bracken fronds growing either in or at the edge of evergreen-forest, very humid and with an undergrowth of Jasmine, Caladiums, ferns, bracken and brambles. In each case also the ground was very steep and broken with many boulders and outcrops of rock. The nests were all much alike ; in shape they were rather like short-necked broad pears, with an entrance almost at the top and with no porch. The chief material was down from the seed-pods of *Bombax malabarica* held together with little strips of moss, many spiders' webs and a few bits of grass. The lining was simply cotton-down without an admixture of anything else. In a nest taken in the Khasia Hills, fibres were substituted for the grass and moss. These materials were most plentiful at the neck of the pear or oval, and were used with the spiders' webs to wind round the supporting stem of the bracken.

The eggs taken by myself are more like those of *gouldiæ*. The ground is white ; in one set of three there are a few specks or tiny blotches of brown scattered irregularly over the surface, and in the other more numerous little blotches of brown, with well-defined broad rings at the larger end. They measure between 14·3 and 15·5 mm. in length and between 11·0 and 11·7 mm. in breadth.

Twelve eggs average 15·6 × 11·8 mm.

It is extraordinary the difference between the eggs and nests taken by Osmaston and Whymper and those taken by Stuart Baker but there seems to be no question of doubting any of them.

I had the great privilege of seeing some very fine specimens of this beautiful Sunbird captured by Dr. Law at either Sandakphu or Phalut. Although confined to small travelling cages they seemed to be very healthy and happy. I hope Dr. Law will give us some information about these birds in captivity and of the others he brought down with him at the same time. Any notes as to their food and means of keeping in captivity would be most interesting to our many bird lovers. We wonder how the birds did in the plains when taken away from the beautiful surroundings of Dr. Law's home in Darjeeling.

(To be continued)

Bat Collecting in the Darjeeling District.

By

C. PRIMROSE.

(With one black and white illustration).

It is many years now since I took up Bat collecting as a hobby. I was then working in your District as an Assistant in Tea and was under a boss who allowed his underlings little leisure during the hours of daylight. My position was much like that of the boy who was digging potatoes when a kindly gentle man arrived on the scene and stood watching him for sometime. The gentleman said "Well, my little man, what do you get for digging so hard ?" "Get !" said the perspiring youth indignantly, "Nuffink if I do and Hell if I don't !" Consequently I was at work, with short intervals for meals, from 6 a.m. to 6-30 p.m., or later, if there were heavy flushes on. In the cold weather whilst the Assistants on neighbouring gardens could often get an afternoon off, I had to be at work till 4 p.m. when the coolies working on Beegah downed tools. The roads, in those days, were only fit for that game little beast, the Bhutia pony, on which, it was not safe, after dark, to go at any speed. "Nipping over to smiths on the motor bike" was unthought of, so one had to find means of recreation during the hours twixt the gloaming and the murk. Being a keen, but poor, exponent of shot gun shooting, the idea of practising on

Bats, which I had noticed were numerous in the vicinity, occurred to me. Accordingly the next evening saw me proceeding gun in hand, to the muster ground, near the factory, as soon as I could, legitimately, do so. There were some lines near the factory, where the tea maker and other factory hands lived, and it wasn't long ere I was spotted and one or two *chokras* arrived "at the double" shouting to their pals "Come quickly the Chota Sahib is going to shoot something." The labour force, on that garden, was one of the best I've ever worked with consisting mainly of Thamungs and Gurungs, with a leavening of Limbus and Rais and all unspoilt by education or political teachings. I had not expected an audience and was nearly telling the *chokras* to "*jao*," when my better feelings reminded me that they, no doubt, hungered for a break in the monotony of work as much as I did. Had not Mandhoj, aged about 13 years, who looked an exact replica in miniature of a Subedar in the 1st/7th Regiment, brought me, with a *too* innocent expression on his circular face *Hookus* (Imperial Pigeon) eggs stolen from Jitbahdur Chettris pigeon loft, and laughed as heartily as his unwashed pals when telling them that it wouldn't work with the Chota Sahib. Had they not, more than once, given me warning, in discreet manner, of the Burra Sahib's approach, so that I might appear as he would wish, "Keeping a strict eye on those young *soors*," instead of enjoying a cigarette and day dreaming of Life as I would like it.

No there was far too much genuine fellow feeling between me and those beautifully hideous, cheery Limbus and Rais for me to dream of asking them to forego the pleasure of witnessing, what to them was a *Tamasha*. I have since learnt, with regret, that many of them are no more, having been killed in the war, which they hastened to join lest they might miss the golden opportunity of, what they, no doubt, fondly imagined was to be, hand to hand fighting. I fear I have digressed but I am sure that those who know their *chokras* and *aurathay ketas* (boys and "women boys," the former earning less than women's wages, the latter full women's wages), as well as I did, will forgive



BROUGHT ME, WITH A TOO INNOCENT EXPRESSION ON HIS CIRCULAR FACE *Hookus* (IMPERIAL PIGEON) EGGS STOLEN FROM JITBAHDUR CHETTRIS PIGEON LOFT.

me. I can only trust that a goodly leavening of such lads still exists in the District as the Gurkha Contingent must depend on such for material to maintain the fine fighting record it has earned. As the poet says,

"Ah those were the days when my beard was black,
I like to remember them, now and then."

These boys, as I shall show, were, as regards Bat collecting, what the Babu would describe as "adventitious aids" so that I plead that a description of them is not, altogether, out of place to get back to the subject. Their presence and the whispered conversation, liberally interlarded with unprintable language, which I overheard, made me determined to shoot as straight as possible and only when the chances of success were in my favour.

So here you see their presence served one very useful purpose *viz.*, to teach me not to hurry and to make certain of my aim before pulling trigger. I, therefore, studied the flight of the various species that were about in order to determine which offered the simplest shots. The Pipistrelle that was the size of a small leaf and flew like a dried one caught in the eddies of a tornado, I cut off the list straight away. As the light was fading rapidly I had to come to a decision soon if I was not to still further to reduce my chances of hitting the object aimed at owing to the poor light. Hearing an eager cry of "Oh! What a big one" from one of the boys I swung round; he was right, here came a Bat that looked huge in comparison to the others and flew after the steady manner of a Pilot on his first solo flight. I swung on to it but the eager, tense whispers of "now it will die "made one use the gun as a rifle and "*mak siccer*" before pulling the trigger; on doing so I was pleased to see it drop like a stone, and a very small one it looked with closed wings, and land in the tangle of tea some 20 yards away. There was a wild rush on the part of the boys, which I had to check by using language as foul as theirs to prevent the bat being trampled into the ground and so losing it altogether. They started to work in silence, quartering the ground like well trained spaniels, but ere

long the witty chaff and banter started "Look a Dhulbir", a voice would say, "has just realized that he can't recognize a bat if he saw one, so he's off to look for a girl."——"would reply Dhulbir, aged 12, "why shouldn't I? You can't obtain milk by squeezing my lower lip as can be done with you." "Oh! Rugobir, don't go to steal makai from the Lepcha busti;" one of them would call to an urchin searching for to the left. For all the banter they were searching diligently and it was not long ere Dhulbir, with a triumphant whoop, holding the Bat up by one wing, invited the rest to come and have their five senses educated by him so that they would be able to distinguish a Bat from a woman.

The Bat being duly secured, and the boys told there would be no more shooting that evening they departed laughing and jabbering and as someone once wrote of a crowd of boys coming out of school. "There were some that ran and some that leapt like troutlets in a pool." These urchins, be it remembered, had just completed a real hard day's work. So you see, as retrievers, they were of great value in saving time and temper and after very little practice such a thing as a lost Bat was practically unknown. Many specimens of such species as are addicted to entering houses at night; such as *Hipposideros fulvus* and *Harpiocephalus harpia lasyurus*, were brought in by these boys. One of them procured for me two specimens of a very rare species indeed. They would also tell me of spots where Bats were numerous or where a particular species was to be found, so, altogether, they helped me considerably. They grew terribly eager and I only had to mention at leaf weighing, that I was going Bat shooting that evening when they would be found waiting eagerly for the evening shoot. When, as often happened, Bats were conspicuous by their absence, the cheery banter of these urchins kept me from being bored. "Aray huroo," a voice would say "if we could only find their nests and get the Sahib their eggs, he would give us at least eight annas for each one." Another would say "there speaks the Limbu, you all know the story of the Limbu don't you? Perhaps Rugobir (the one

who thought Bats were oviparous) doesn't, so here it is. A Limbu said to his mother "mother what happens to the fish when the rivers catch fire? "They climb up trees, my Son." "Oh mother! How stupid you are, they are nothing like buffaloes;" Rugobir retorts angrily "one Limbu will make ten—Jimdhars or Mongurs climb trees and I am ready to prove it." Just then a Bat appears and gives a difficult shot and is missed badly. The temsion is broken and an argument takes place as to why the Bat was missed. I trust that I now have shown that *chokras* are really "adventitious aids" to the would be Bat collector and that he would be will advised to do as Mr. Sleary of Dickens' work suggests "Do the wise thing and the kind thing too, and make the best of them; not the worst." Any of my readers, and I hope they are few, who "hate the dirty little swine" will, if they decide to try it, find that Bat collecting without *chokras* is not exactly Bat collecting without tears. A vain search in sodden, leech infested weeds for a dead Bat does not improve one's temper, nor is a high percentage of lost Bats likely to keep down costs. When the Bats are in a perverse mood waiting for a chance of a shot is apt to be boring when unrelieved by the cheery humerous banter of the urchins or the infections cheering influence of their optimistic grins.

So much for one of the adventitious aids to collecting. Let us now turn to essentials. Besides a gun and ammunition the outfit required is sufficiently inexpensive to be within the reach of any one drawing even a Junior Assistant's screw. For a start, two large size, cork lined, insect boxes will suffice for storage, whilst for the preparation of specimens any sharp pen knife, a pair of good nail scissors, a pair of forceps, cotton wool, arsenical soap, needle and thread and some stout pins are all that is wanted. As regards the preparation of specimins, I will, if the Editor desires it, write later. He is in a position to know whether the publication of a note on the subject would interest or bore the Society's Members. (The Editor has desired it and has received an article on that subject which will be published in our next issue.)

There are several methods of securing specimens all of which the keen collector will employ, and I shall comment on those which I have tried with success.

For shooting, any gun and cartridges loaded with No. 12 shot will do. I consider the 20 bore the ideal collectors gun but much more depends upon the man behind it than on its bore. As there are many species that are most easily got by shooting, this method will be continuously used. It affords excellent practice and training for hand and eye but is not as cheap as some might imagine. A good shot, using trained *chokras* to retrieve, will hardly average more than 6 bats for 10 rounds; a poor shot will not do more than 2 in 10. Shot bats, especially the smaller species whose skulls are very delicate, are liable to be severely damaged. The skull, being of major importance, should be perfect in every specimen that can be considered good. Constant practice with the gun is necessary to make the collector proficient at this method of collecting.

Certain species enter buildings' freely at night, in search of insects which have been attracted there by the light. When a Bat enters a room, the doors and windows should be closed to prevent its escape and then it may be killed with a tennis or, preferably, a badminton racket. When the collector is preparing a specimen killed in this manner, the damage caused by too vigorous use of the weapon is apparent and will teach him to use a minimum of force in his strokes. Again certain species, the *Hipposideros* genus in particular, love to fly, to and fro, along a definite beat in search of insects. For this purpose they prefer spots where trees, growing on either side of the road, meet overhead and form a long tunnel. In such spots the racket may be used with good effect. Almost any Bat will swoop at an object thrown near it and by the use of this ruse I have secured many a specimen that would otherwise have to be shot. Armed with a racket and a few stones about the size of a plum, watch for a Bat coming towards you at a height below 20 feet from the ground. When it is still some yards away, from a line drawn parallel with your body, throw up a stone towards it

and be prepared with the racket. If the stone has been properly thrown it will swoop after it and come within reach of your racket when it is up to you to kill it. As with any sport practice is necessary before proficiency can be expected, but the fact that I have frequently killed 6 specimens, of an evening, by this method shows that its use should not be neglected. News that rewards will be paid for all Bats brought in will produce quite a number of specimens. Fuel suppliers should be informed of this as they frequently come across specimens in hollows in trees felled by them. I used all the methods described and the fact that I collected 19 species in little over a year, in the District, speaks for itself. The District is decidedly rich in this interesting order of Mammalia and their collection forms very interesting recreation. It develops ones powers of observation rapidly as being creatures of the dusk and only seen in flight as dark objects against a lighter back ground one learns to recognize the different species in flight as Davids' watchman did the courier who brought the news of the victory over Absalom "His running is like the running of Ahimaoz, son of Zadok". Much remains to be learnt about the food, breeding, and general habits of our Bats, and the keen collector has ample scope for preparing valuable notes and data on such matters.

That he will be dubbed insane by his fellow planters and suspected of having sunk lower than a Lepcha, in his diet, by his labour force will not, I am sure, deter any keen naturalist from taking up this fascinating hobby, I trust that there are some whom this note may induce to collect Bats and I can promise them that they will find their shooting improve beyond recognition and that part of the day, from the completion of work till bed time pass, well, like a Bat, instead of dragging "like a weed clogged wave."

A missing Link.

Somewhere along the Ghoom-Sonada road and inhabiting one of the streams which traverse it, is to be found a strange and archaic dragonfly, one of those relics which have survived from prehistoric times.

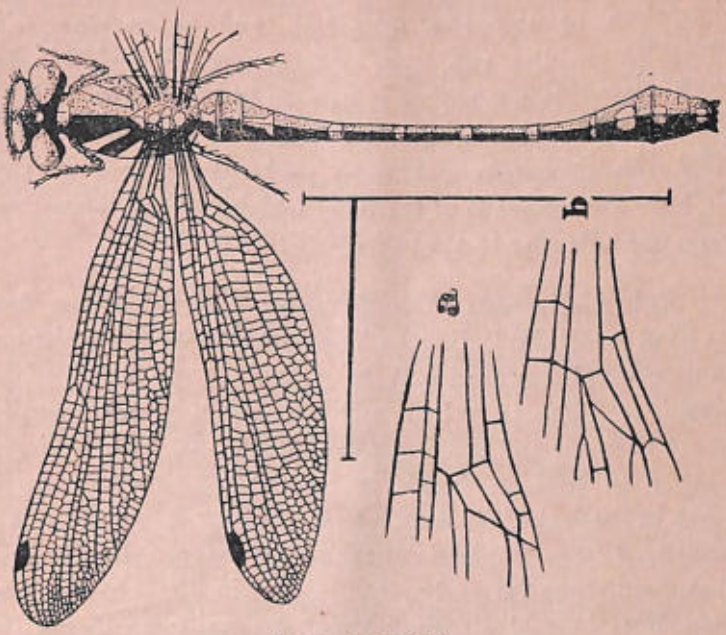
On what data do we base such a fact ?

In June 1918, Dr. S. Kemp hunting for water-life fished up a dragonfly larva in a stream just above Sonada. This was sent to Dr. Laidlaw of Uffculme, Devon for identification and, after dissecting out its wing sheaths, he came to the conclusion that it was the larva of an *Epiophlebia*. This was subsequently endorsed by Dr. R. J. Tillyard. Now there is only a single species of this archaic genus known which is found only in Japan, so that it was very probable that a second species existed. Dr. Tillyard, who described the larva, took the unusual course of naming this hypothetical species *Epiophlebia laidlawi*, after its larva.

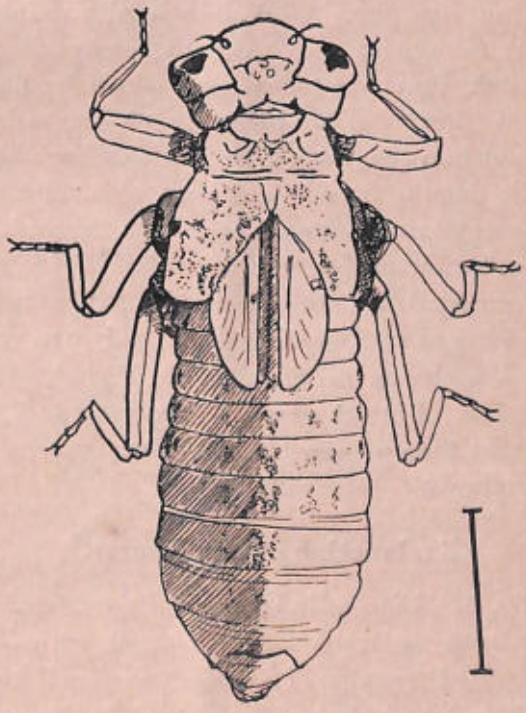
The larva of the Japanese species, *Epiophlebia superstes*, was at that time unknown but has since been discovered by a Japanese student. Comparing the two I find it difficult to find any differences ; in fact the two are so similar that I should not be surprised if, when *E. laidlawi* eventually turns up, it turns out to be conspecific with *E. superstes*.

The larva of *E. laidlawi*, found in June, was in its penultimate instar so the imago should be on the wing in the autumn. The Japanese species appears early in the year, April and May, and we have to bear this in mind. The Darjeeling species however lives at a much higher altitude and this may influence its time of appearance. What is it which gives such great scientific interest to this interesting insect ?

I have given a figure of the Japanese *E. superstes* together with an enlargement of the base of the forewing. Note how it corresponds to that of *Megalestes major*, a Darjeeling dragonfly belonging to the suborder *Zygoptera* and yet the head and body of *E. laidlawi* are essentially Anisopterous. We thus have a dragonfly possessing the



TEXT FIGURE I



TEXT FIGURE II

characters of the two suborders and so serving as a link between the two. For this reason, *Epiophlebia* has been placed in a suborder of its own known as the *Anisozygoptra*. The *Anisoptera* are thought to have evolved from the *Zygoptera* and most probably have—here then we have a descendant of the link which marked the passage from one suborder to the other.

Epiophlebia rests like a *Lestes* or with its wings flat; its head is strikingly like a *Chlorogomphus* or *Allogaster* and in its general appearance it is strongly reminescent of *A. hermione*, both in colour and formation. It is a smaller insect however and has a weaker flight. It will be found resting on herbage beside its parent streams or even on rocks in the bed of streams. I searched for it myself in the month of May but was not the lucky one, probably because that month was too early; the water in the streams was then bitterly cold although *Megalestes major* was beginning to emerge. It will be a red letter day for the fortunate collector who succeeds in taking this elusive insect. For the benefit of anyone who cares to join in this search for a missing link, I give the following as an aid to finding the *Epiophlebia* stream. This latter, in so far as I recollect, was the second on the road after commencing the descent from Darjeeling to Sonada and was at a point where the khud side recedes some distance back from the road. At the point where the stream emerges from the hill side, stands an enormous somewhat quadrangular boulder, as it were a sentinel to the fastenesses of *Epiophlebia*. Probably one would have to explore the stream on both sides of the road, particularly on slopes below. I attach so much importance to its scientific value that I am prepared to offer fifteen rupees for every specimen captured.

Explanation of text-figures.

Text-fig. 1. *Epiophlebia superstes* Selys,. *a*. Base of forewing shown enlarged and compared with—*b*, which shows the base of forewing of *Megalests major* Selys. Note how the discoidal cells are of approximately the same shape and how the wings are stalked as in the *Zygoptera*. Ground

colour of imago chocolate brown, marked with citron yellow. Actual size delineated.

Text-fig. 2. Larva of *Epiophlebia laidlawi* Tillyard, from an actual photograph of the type larva. Actual size delineated.

LT. COL. F. C. FRASER, F.R.E.S., I.M.S.

A Note on the Heterocera of Darjeeling.

The Heterocerous Fauna of the Darjeeling district, in spite of its richness, is unfortunately much less known than the Rhopalocerous. I propose, therefore, to publish from time to time the results of my collecting in Darjeeling.

The present note deals with a small collection made between the 9th and 12th August 1934.

I have made no mention of the rarity or otherwise of the various species, as I consider that the results of such superficial collecting are bound to be misleading, unfavourable weather conditions may make a common species appear to be rare, or conversely the discovery of a colony of a rare insect may give the impression that it is common.

In the following list I have made use of the undernoted expressions :—

"At rest" *i.e.*, resting among herbage, or on tree trunks, rocks etc., or being beaten therefrom.

"Flying" *i.e.*, flying in the sun without being disturbed.

"At Light" *i.e.*, caught at electric light, usually in the Hotel Mount Everest.

I have followed Hampson's Moths in the Fauna of British India as far as possible as regards nomenclature. Where there have been changes, I have given Hampson's names in brackets. The numbers in the margin are same as those in the Fauna of British India Moths.

Sphingidae.

125. *Theretra oldenlandiae*, F. *puellaris*, Btlr. At light.

Drepanidæ.

704. *Teldenia vestigiata*, Btlr. At light.
... *Leucodrepana fulvicosta*, Dudg. At light.
742. *Spica luteola*, Swinh. At rest and at light.

Lymantriidæ.

1011. *Dasychira bhana*, Moore. At light.
1049. *Gazalina chrysolopha*, Koll. At rest.
1055. *Euproctis divisa*, Wlk. At light and at rest.
1119. *Caragola* (*Cavïria*) *clara*, Wlk. At light.

Arctiidæ.

1179. *Diacrisia* (*Spilosoma*) *casigneta*, Koll. At light and at rest.
1303. *Kerala punctilineata*, Moore. At light.
1312. *Agylla* (*Sidyma*) *apicalis*, Moore. At light.
1327. *Chrysorabdia viridata*, Wlk. At light.
1352. *Eilema* (*Lithosia*) *reticulata*, Moore. At light.
1506. *Tyana falcata*, Wlk. At light.
1530. *Celama* (*Nola*) *fasciata*, Wlk. (*nigrifascia*, Hmpn.) At light.

Agaristidæ.

1570. *Seudyra* (*Zalissa*) *bula*, Moore. Flying.

Noctuidæ.

1601. *Chloridea* (*Heliothis*) *obsoleta* F. (*armigera*, Hon.) At light.
1631. *Rhyacia* (*Aggotis*) *costalis*, Moore (*plecta*, Hmpn. part nec L.) At light.
1635. *Rhyacia* (*A.*) *basistriga*, Moore (*descripta*, Brem.) At light.
1640. *Axylia* (*Agrotis*) *putris*, L. At light.

1647. *Rhyacia* (*A.*) *c-nigrum*, L. At light.

1686. *Scotogramma* (*Hadena*) *submarginalis*, Wlk. (*incisa*, Moore). At light.

1715. *Parasrichtis* (*Euplexia*) *flavistigma*, Moore. At light.

1735. *Euplexia auroviridis*, Moore. At light.

1749. *Triphaenopsis* (*Euplexia*) *pulcherrima*, Moore. At light.

1823. *Tycracona* (*Acronycta*) *obliqua*, Moore. At light.

1833. *Amyna punctum*, F. (*selenampha*, Guen.) At light.

1848. *Eriopus* (*Callopistria*) *indica*, Btlr. At light.

1894. *Sideridis* (*Leucania*) *rufistrigosa*, Moore. At light.

1913. *Sideridis* (*L.*) *unipuncta*, Haw. At light.

1963. *Canna* (*Diphthera*) *pulchripicta*, Wlk. At light.

1965. *Canna* (*D.*) *prasinaria*, Wlk. At light.

1969. *Perciana marmorea*, Wlk. At light.

2181. *Nagasena albescens*, Moore. At light.

2217. *Chlumetia alternans*, Moore. At light.

2282. *Odontodes aleuca*, Guen. At light.

2443. *Homoptera umbrina*, Guen. At light.

H. umbrina f. *albicincta*, Guen. At light.

2470. *Arcte caerulea*, Guen. At light.

2480. *Chrysopera combinans*, Wlk. At light.

2650. *Calpe emarginata*, F. At light.

2856. *Nodaria innocens*, Btlr. At light.

2909. *Dichromia quadralis*, Wlk. Flying and at rest.

2943. *Hypena rhombalis*, Guen. At light.

2949. *Hypena lacessalis*, Wlk. At light.

2950. *Hypena lativitta*, Moore. At light.

2953. *Hypena castanealis*, Moore. At rest and at light.

Epiplemidæ.

3065. *Dirades adjutaria*, Wlk. (*theclata*,, Guen.) At light.

Geometridæ.

3082 *Urapteryx ebuleata*, Guen. At light.

3088 *Sirinopteryx rufivinctata*, Wlk. At light.

3096 *Myrteta sericea*, Btlr. At light.

3133 *Peratophyga aerata*, Moore. At light.

3171 *Eurymene inustaria*, Moore. At light.

3175 *Anonychia grisea*, Btlr. At rest.

3289 *Psyra angulifera*, Wlk. At light.

3385 *Ectropis (Boarmia) duplexa*, Moore. At light.

3422 *Boarmia infixaria*, Wlk. At light.

3499 *Arichanna lapsariata*, Wlk. At light.

3518 *Abraxas martaria*, Guen. At light.

3554 *Euphyia (Cidaria) silaceata*, Schiff. At light.

3700 *Perizoma (Larentia) maculata*, Moore. At light.
Parazoma ferax, Prout. At light.
Eupithecia tricossa, Prout. At light.

3826 *Hydrelia subobliquaria*, Moore. At light and at rest.

3842 *Cambogia pluristrigata*, Moore. At light.

3845 *Acolusa (Cambogia) pictaria*, Moore. At light.

3883 *Scopula (Craspedia) undulataria*, Moore (*remotata*, Hmpsn, partnec Guen.) At rest.

3916 *Acidalia sanguinaria*, Moore. At light.

3969 *Timandra amata*, L. *convectaria*, Wlk. (*amataria*, L.) At rest.

4018 *Dindica (Pseudoterpna) polyphaenaria*, Guen. At light.

4033 *Chlorodontopera discopilata*, Moore. At rest.

4135 *Thalera argutaria*, Wlk. At light.

Pyralidæ.

4163 *Crambus dividellus*, Snell. At rest and flying.

4478 *Orthaga aenescens*, Moore. At light.

4483 *Rodaba angulipennis*, Moore. At light.

4702 *Talanga sexpunctalis*, Moore. At light.

4705 *Stegothgris diagonalis*, Guen. At light.
4786 *Zinckenia fascialis*, Cram. At light.
4803 *Padyda salvalis*, Wlk. At light.
4804 *Pagyda botydalis*, Snell. At light.
4821 *Rhimphalea trogusalis*, Wlk. At light.
4874 *Nevrina procopia*, Cram. At light.
4890 *Dichocrocis evaxalis*, Wlk. At light.
Pilocrocis spec. nov. near *coptobasis*, Hmpn. At light.
4948 *Botyodes asialis*, Guen. At light.
4971 *Sylepta iopasalis*, Wlk. At light.
4979 *Sylepta deficiens*, Moore. At light.
5011 *Glyphodes psittacalis*, Hubn. At light,
5012 *Glyphodes hilaralis*, Wlk. At light.
5015 *Glyphodes vertumnalis*, Guen. At light.
5134 *Maruca testulasis*, Geyer. At light.
5205 *Pionea aureolalis*, Led. At light.
5232 *Pyrausta eclatalis*, Wlk. At light.

I have also several still unidentified specimens.

D. G. SEVASTOPULO, F.R.E.S.

Calcutta, the 11th August, 1935.

Observations on Centipedes, Hairy Caterpillars, Monitors and Geckoes.

By

Col. H. S. WOOD, I.M.S.

The heading of this article seems rather a promiscuous one, but our Editor writes that he wants an article from me and so here it is. I must confess that I am almost pumped dry after writing my book "Shikar Memories". Another reason for writing this article is that "Kim" in his column in the "Statesman" has raised many questions regarding these creatures and it is, therefore, in the hope of elucidating some of these problems that I have written this article for owr Journal for those of our members who are interested.

1. Centipede stings. The effects of Centipede stings are exactly like those of a burn of the first degree. I have, unfortunately, experienced the sensation myself.

One night I felt something crawling on my chest and my open palm came bang down on the part and the Centipede, about 3 inches long, was killed. Next morning I saw there was an irregular area of intense redness, accompanied by a burning pain. This constitutes the difference between the effects Hairy Caterpillars and the stings of a Centipede have on the skin. Each leg of the Centipede contains poison of an irritative nature, which may be fatal in some instances. This irritative agent is, most probably, formic acid which is found in Bees, Ants, Wasps and Scorpions.

The irritation caused by Hairy Caterpillars is due to the hairs becoming attached to and penetrating the skin.

If one feels or sees a Centipede crawling over one, *never* exert any pressure on it, as it will then, at once, dig all of its legs into the skin.

Once, when shooting in the Kubbo-Kale Valley I saw a Centipede which must have been fully 10 inches long. The general colour was electric blue with bright coral-red legs. I may say I was *quite* sober at the time ! ! I always get

a shudder when I think of that uncanny creature. Unfortunately it disappeared into the ground before I could kill it; and it was, certainly, the most horrible thing I have ever seen in my tramps through the forest.

It is very curious how the Centipede incubates its eggs, I once turned up a box in our garden and saw a fairly large Centipede curled up and grasping all her eggs, with her legs, in an embrace. I stirred her up and scattered her eggs. In a short while she collected them all again and curled up. I killed the lot. The eggs were just like little pearls.

Now with regard to Hairy Caterpillars, *bhoora bhalus*, or " Wooly Bears ".

In Assam, just about the end of April, millions of these Caterpillars drop from the trees to the ground each suspended by a fine thread to break the fall, I think the object is to pupate amongst the dry leaves of the forest. Once while shooting Green-Pigeon I was glued to my tree and heard *pit pat*, all round me, like the sound of falling raindrops, then I saw thousands of these Caterpillars, not more than an inch long, dropping from the trees. I was so taken up with the Pigeons that I took no further notice of these insects. When I returned to the Rest House, I felt intense irritation, weals rose up, but not much redness and both my eyes were nearly bunged up with swelling of the eyelids.

It is not only the Hairy Caterpillars which produce this irritation. A certain white moth is most irritating and, in the Himalayas, one finds a pretty green, oval shaped Caterpillar, without hairs and with very short legs, looking more like suckers, on the Mussooree tree, a tree which has small round berries black with divisions and rather good to eat. It has numerous branched spines on the back and to be stung by one of these is far worse, in its effect, than that of the Wooly Bear.

Now the tip for alleviating the pain from these creatures in this. Never rub anything into the part affected, lead lotion, cocaine etc. are all useless as they only drive the

hairs deeper into the skin and increases the irritation. Get someone, a he or a she, to rub his, or her, hair against the part; the caterpillars minute hairs get entangled in the imbricated scales of the human hair and are thus removed.

Once I was called to see my C. O. who was prancing and dancing round his room, with only a towel round his waist, scratching madly and swearing like a trooper. Noticing that he had just had a bath, I inspected the bath tub and found that he had been sharing his bath with a Wooly Bear so, knowing the remedy, I found myself rubbing my head against various parts of my Colonel's anatony, much to his relief.

In the Assam jungles there is a plant called the *Raj bichu* or King Nettle. It has beautiful green smooth leaves and bears clusters of small white berries like so many hailstones; stings from this plant are not pleasant and the irritation, which is intense, lasts several days and leaves a numb feeling in the parts affected.

When my regiment was marching through the great Namba Forest, B., one of our officers, left the column for a certain purpose. Having no ammunition he saw the attractive looking leaf of the *Raj-bichu* plant and used it. He emerged out of the jungle in an awful state and sought my advice; for days after, like the engine, he had a tender behind !!!

2. Monitors.

In Assam (and many other places. *Editor*) this lizard is known as *Goe-Samp* and the ordinary Hindustani name is *Biscobra*. It is not poisonous as many Indians believe it to be. They say that when bitten if one can reach water before the Monitor one recovers from the bite. Of course the bite can give rise to a nasty wound which may be followed by septic inflammation.

The teeth are blunt but the muscles of the jaw are very powerful like those of the rest of the body. To view a skinned Monitor or a Wild dog shows the perfection of

muscular development, there is not an atom of fat anywhere and the creatures are in perfect training.

My hunting pack of seven dogs were very keen on hunting Monitors and whenever one was put up, off they would go in full cry. One day I heard cries like those of a stricken *pi*-dog and hurrying up found a large Monitor hanging on to Rag's, the leader of the pack, upper lip. I killed it with a stick but when dead I had to open its jaws to release the dog. After that incident my dogs were clean off Monitors and preferred chasing something else.

In Assam there are, I think, two kinds of Monitors but there may be more as once, while shooting snipe in a bheel, I came across a small, prettily marked, stumpy-looking beast with a blunt, short tail. It was more like a newt than anything else as Monitors have long slender tails.

When brought to bay Monitors lash their tails from side to side to protect their rear and to get a whack must smart like a lash from a whip. The commonest Monitor is of a uniform greyish colour which may be, in some, darker or almost black. This species does not take readily to water. The other is lighter in colour and has rings and circles on its skin like the markings of a Python. I have killed this variety up to 5 feet 5 inches in length. They are very fond of water and swim and dive with the greatest ease. I have seen them take a running leap and plunge into a river. When disturbed on land they go off at a great pace and make a rustling sound in dry jungle.

The claws of the forefeet resemble more the talons of some raptorial bird than those of a reptile and they are able to cling on to anything with the greatest tenacity. In Indian history it is related how a fort in Gwalior was taken with the help of a Monitor. A rope was tied on to one which climbed up the wall and hung on to the edge of the parapet by its claws. The beseigers swarmed up the rope and took the fort !!!

Once while tracking up a Buffalo a large Monitor was put up and disappeared into the hollow of a large fallen

tree. My tracker being an Assamese, the flesh of a *goee samp* meant everything to him. He located it by placing his ear against various parts of the trunk, of course by its breathing. He then started hacking with his *dah*. In time the tail emerged and was pulled but nothing could shift the beast and it was not until we could get a grip of that Monitor round his body that we were able to dislodge him. It was duly tied up with strips of cane and as we were going through thick forest, it was given to a passerby to take back to our camp but it was never seen to the great disgust of my trapper, who gnashed his teeth with rage.

The meat when cooked is white like that of a fowl and tastes like one. It is supposed to have aphrodisiac potency like the flesh of Hornbills. (The flesh of the Crow pheasants is said to have the same effect. *Editor.*)

I once had an unusual experience with a Monitor. I was sitting up, on a *machan*, for a Tiger when I heard a snoring sound above me. I did not mind this at first but as night advanced it got on my nerves. I concluded that it must be a Python or a Monitor. Leaving my *machan* and taking my "British Warm" with me, I clambered up and saw a large slit in a thick branch leading into a cavity and the sound issued from the deep recess. I shoved my coat into the cleft and so made sure of being left undisturbed by the "Sleeping beauty". Next day, on cutting away the branch, a large Monitor emerged much to the delight of my men.

The tongue of the Monitor is forked and black and is constantly being obtruded like a snakes' and probably its resemblance to that of a snake has given rise to the erroneous theory that Monitors are poisonous.

Their food consists of frogs, small lizards, birds' eggs and insects. In the aquatic variety fish and tadpoles are the staple diet. Once, when shooting in Burma, we called a halt, for the midday meal, in the partly dried up bed of a small river. I heard some splashing going on round a bend and went very quietly to investigate it. I saw a Monitor scooping out tadpoles from a pool, with one of its fore-legs

and as they were landed they were promptly eaten. The operation was done very neatly and cleverly just as a human being would have done it.

A curious thing is that two or three times, when tramping the jungles, I have come on Monitors apparently dead. On examining them I never found any trace of injury and no fang marks of a snake. There seemed to be a complete paralysis, only the heart and lungs acting feebly. What can be the cause of this ? I give my opinion for what it is worth. It is well known that the blood of Monitors harbours the, so called, Trypanasomes which are flagelleted, microscopic organisms that are the cause of Sleeping sickness in Africa, might these creatures be suffering from a form of Sleeping sickness? It would be interesting to pursue this investigation. All these, apparently, moribund Monitors were found in the Dehinghi forests of the North Cachar Hills.

There is an extensive trade done in Monitor skins to make into shoes, hand bags etc. and such is the rate of destruction that it is only a matter of time before these interesting creatures are exterminated in India and elsewhere. Some legislation is necessary to stop the export of skins before it is too late. (They are protected pretty considerably now. *Editor.*)

I believe that the Monitors would make nice pets. The great Komodo lizard from the volcanic island in the Java seas is one. When it was first discovered, only a few years ago, fabulous stories were told of its ferocity and ability to swallow a pig. These stories turned out to be greatly exaggerated. The specimens in the Regents Park Zoo have become so tame and docile that they follow their keeper when he goes on his daily rounds.

(To be Continued.)

To The Editor.

SIR,

I was interested to read in Col. Wood's note on the Green Magpie its habit of preening its wings with a Peach worm. Col. Wood is of the opinion that the feet of the worm being suited to the purpose are used as a comb. I have observed other species of captive birds, Mynas (*A. tristis* and *Æ. fuscus*) and *D. paradiseus*, rub their wings and vent vigorously, producing a loud rustling in the process, with a certain common species of active brown ant and the pulp of an orange. Only the one species of ant was used by these birds and all, when given a piece of orange pulp used it in exactly the same vigorous manner. I am, therefore, inclined to think that the Peach worm was probably used, by the Green Magpie, for the same objects as the ants and orange pulp are by the birds I have observed doing so, as a scent or an oil, or both. If the Peach worm is, as seems likely from his description of it, a small reddish Millipede, I know, from experience, that it possesses an acrid scent. I consider it likely that the object of using such scents is to act as a deterrent to vermin. I have noticed that the domestic dog is keenest on rolling in smelly substances when infested with fleas. In these parts they seem to enjoy rolling in the following highly scented material, the droppings of the Sloth Bear, a *very* dead Shrew, Crab or Toad and, occasionally, that very odiferous matter a rotting snake. When quite free of fleas my dogs frequently pass the most tempting dead Shrew with no more than a sniff at it.

With regard to Col. Wood's remarks on the colour of the Green Magpie I can only say that all the many specimens which I have seen in their natural haunts have been, to my eye, exactly the colour of the specimen illustrated by you in the very excellent plate in the journal. Col. Wood's remark, in his last sentence, *re* : the change in the colour of the bill, simultaneously with that of the plumage, would seem to indicate a departure from normal health or that, in other words, that the Green Magpie is subject to fits of "the blues" !

I hope Dr. Law will be good enough to contribute a note on the subject to the journal.

C. PRIMROSE.

To The Editor.

SIR,

I wonder if any of your members has any information as to the real reason for elephants turning 'rogue'. The usual theory is that some old cantankerous elephant is turned out of the herd, specially during the 'musth' or rutting period, by a more powerful male, and this old and ill-tempered fellow, gradually, becomes a confirmed 'solitary', and in time becomes dangerous to human life and property. My experience in the Chittagong Hill Tracts, leads me to question this, for on at least three occasions, I was attacked by well-known 'rogues' which, after being shot, turned out, in spite of their commanding size, to be quite young fellows, with no signs of wounds or injuries likely to cause them pain or discomfort, which might make them sour-tempered. One, who very nearly got me, was quite small, standing barely seven feet at the shoulder, and must have been only a young lad, yet he had been by himself for months, in the plains during the rains, when all herds were away among the higher ranges. Every rogue I shot myself, and every other which was shot by others, and which I had the chance to examine, had undoubted need for a dentist, for at the root of the tusks of each one of these animals, I found pounds and pounds of live maggots, which must have caused them the most excruciating agony. I am inclined to think that it is this tusk-disease, which makes them, young and old, so bad tempered, and forces the others to kick them out of the herd. Whenever tracking a 'rogue' or 'solitary' (undeclared rogue), I have noticed that the animal frequently thrusts his tusks through ant-hills, or soft saplings, and as I have never seen the marks of tusks, thrust through in this manner, when a herd has passed, nor have I seen our tame elephants doing this, I feel that I am not far wrong in holding that they do this in order to relieve the agony caused by the maggots far inside their jaws. During my stay in that area, I tracked and followed up herds and solitaries literally by the hundred, so my observations were

not quite casual, and were spread over a period of nearly four years. I hope this may bring some light on the matter.

Yours sincerely,
S. K. GHOSH.

(We hope that those of our members who have had much experience with elephants, wild and tame, will send us their views on the subject for publication. *Editor*).

DARJEELING NATURAL HISTORY SOCIETY.

The Society was started about the end of 1923, the objects being to maintain the Museum in a proper condition; to promote the study of Natural History and to get together, as complete as possible, collections of Natural History specimens from a limited area, including "the civil districts of Jalpaiguri and Darjeeling and the State of Sikkim", as well as what could be procured from the neighbouring countries of Tibet, Bhutan and Nepal.

The Government and Municipal grants not being sufficient for our purpose, it was proposed to enrol members so as to increase our funds, and a Quarterly Journal has been started. It is hoped that everybody will join the Society and co-operate to make the Museum and Journal a success.

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THE CURATOR,
Natural History Museum,
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A note on the Heterocera of Darjeeling.

After	1631	*Aggotis* to *Agrotis.*
	1715	*Parasrichtis* to *Parastichtis.*
	4705	*Stegothgris* to *Stegothyris.*
	4803	*Padyda* to *Pagyda.*
	5134	*testulasis* to *testulalis.*



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THE INDIAN PIED KINGFISHER
(Ceryle rudis leucomelanura REICHENB.*)*

JOURNAL

OF THE

DARJEELING NATURAL HISTORY SOCIETY.

Vol. X.—No. 3.

The Kingfishers of our area.

BY

As the coloured plate has not arrived by the time of going to press, which was very early this number, we are giving instead reproductions of Mr. Champion's wonderful photographs of the two Pied Kingfishers, for which we thank him. We are sure members will be pleased to have them instead of our usual coloured plate.

birds while the Laughing Jackass of Australia (*Dacelo gigas*) has even been known to eat small mammals such as rats.

With such a well-known and widely distributed group of birds it is only natural that legends and superstitions should be attached to them. We cull the following from Professor Newton's "*A Dictionary of Birds*":—"The Kingfisher is the subject of a variety of legends and superstitions, both classical and mediæval. Of the latter one of the most curious is that having been originally a plain grey bird it acquired its present bright colours by flying towards the sun on its liberation from Noah's ark, when its upper surface assumed the hue of the sky above it and its lower plumage was scorched by the heat of the setting orb to

the tint it now bears. More than this, the Kingfisher was supposed to possess many virtues. Its dried body would avert thunder bolts, and if kept in a wardrobe would preserve from moths the woollen stuffs therein laid, or hung by a thread to the ceiling of a chamber would point with its bill to the quarters whence the wind blew. All readers of Ovid *(Metam. bk. xi)* know how the faithful but unfortunate Ceyx and Alcyone were changed into—Kingfishers—birds which bred at the winter solstace, when through the influence of Æolus, the wind-god and father of the fond wife, all gales were hushed and the sea calmed so that their floating nest might ride uninjured over the waves during the seven proverbial " Halcyon Days " ; while a variant or further development of the fable assigned to the Halcyon itself the power of quelling storms ".

Jerdon adds that, besides pointing with its bill to the quarters whence the wind blew if hung by a thread to the ceiling, it would even " show the flow and ebb of the tide; and the Tartars of Northern Asia wear its dried skin, as an amulet to secure good fortune."

The Kingfishers belong to the family *Alcedinidæ* of the Sub-Order *Coracii,* of the order *Coraciiformes.* The Sub-order *Coracii* is sub-divided into three families, the *Coraciidæ* (Rollers), *Meropidæ* (Bee-eaters) and *Alcedinidæ* (Kingfishers).

The *Alcedinidæ* have the bill long, stout, straight and pointed with the top of the upper mandible rounded or flattened. The wings are moderate and rounded with eleven primaries the first one very small. The tail is usually short and with ten rectrices. The legs and feet are very small and feeble and the front toes are joined together by skin, especially the fourth one which is united to the third by more than half its length. The feet are not at all adopted for walking and all that Kingfishers can do on the ground is a short waddle.

Our Indian Kingfishers are divided into nine genera, six of which are represented in our area. Except for *Ceryle*



(*a*)



(*b*)



(*c*)



(*d*)

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(*a*), (*b*) and (*c*) THE INDIAN PIED KINGFISHER (*Ceryle rudis leucomelanura*). (*d*) THE HIMALAYAN GREAT PIED KINGFISHER (*Ceryle lugubris guttulata.*)

and *Alcedo* we have only one species of each genus and colour pattern will serve to distinguish the genera of our birds.

A. Black and white ... ... *Ceryle.*

B. Not black and white.

a. Tail shorter than bill.

a.′ Bill black or nearly so ; lower plumage ferruginous ... *Alcedo.*

b.′ Bill coral red ; lower plumage orange-yellow ... *Ceyx.*

b. Tail longer than bill.

a.″ Head brown ; neck and lower plumage buff ... *Ramphalcyon.*

b.″ Head and breast chestnut except chin, throat and middle breast white ... *Halcyon.*

c.″ Above rufous mostly overlaid lilac ; below orange-buff ... *Entomothera.*

We will first take the genus *Ceryle* of which there are three Indian species and sub-species, Whistler having lately described one from Travancore, two are found in our area.

We will not describe the genus as they are the only two pied King fishers in India.

The following key will suffice.

Medium size ; wing 5·5 inches ... The Indian Pied Kingfisher.

Large ; wing over 7 inches ... The Himalayan Great Pied Kingfisher.

The Indian Pied Kingfisher.

Ceryle rudis leucomelanura (Reichenb.).

Field identification :—A black and white bird found near water, in the plains, often seen hovering over and plunging into the water after its prey.

Description :—No description is necessary as the beautiful photographs taken by Mr. F. W. Champion show the markings well. Plate I shows the black and white markings on the back very well. In Plate II (*b*) shows a male bird facing the camera with its double gorget on the breast.

The bill legs and feet are black and the iris hazel. Length about 12 inches ; wing 5·5 ; tail 3 and bill $2\frac{3}{5}$ inches.

The female differs from the male in wanting the lower band across the breast and in the upper one being interrupted in the middle.

Distribution :—This is entirely a plains species with us never ascending the hills so far as we know. Stevens does not even mention it in his "*Notes on the Birds of the Sikkim Himalayas*" though in some parts of the Himalayas it ascends up to 2,500 feet.

Outside our area :—Stuart Baker gives the distribution as :—"Ceylon and the whole of India North to Baluchistan and Kashmir, Burma South to Tenasserim as far as Amherst ; East to Yunnan, the Indo-Chinese countries and South China".

Habits etc :—With us this is wholly a bird of the plains frequenting commonly the rivers and streams of the open country and also tanks and even pools and ditches when these have water in them. In other parts of its huge range it does not confine itself to fresh water being common on brackish lagoons and backwaters and sometimes even on the sea coast. It has also been seen on open rivers running through forest.

Unlike other Kingfishers it does not, usually, watch for its prey from a fixed place and then dive at it in an oblique manner though Jesse records having seen it dive from an overhanging bank ; its usual method of procuring its prey is by flying over the water, about 10 to 30 feet above the surface, and on spying its prey in the water below, it hovers like a Kestrel and drops perpendicularly into the water like a stone and emerges, if successful, with a tiny fish. Often during its plunge it is baulked and then it may either hover

again or else fly off. It usually takes its prey to a bank or a boulder or other fixed perch and eats it there but we have also seen it swallow it on the wing. Its pleasant twittering call, or chirrup, is constantly uttered on the wing. They may often be seen resting on boulders or driftwood on the rivers edge or else on a high bank and, as Whistler says, "these favourite perches are often marked by the pellets of indigestible fish-scales which the bird disgorges, like the castings of the birds of prey. When resting the bird at intervals gives its tail a sharp upward flick." We have also seen one on a telegraph wire close to a big pool on the side of a road.

We do not know when they breed in our area but in Bihar we have taken nests from October to April. Stuart Baker says "The breeding season is roughly speaking, November to March, *i.e.*, after the Rains have ceased sufficiently long for the rivers to fall and expose their banks and before they rise enough to flood the nest holes: Most birds breed from December to February but, on the other hand, some start in October."

With regard to the positions in which nests, or rather burrows may be found, we have taken many both from the banks of rivers and from the banks of tanks. They are placed at about one foot to five feet above the water; "nests" are sometimes lost through erosion of the banks or by flooding through an unusually high rise in the river. With regard to the nest holes Stuart Baker writes in his "*Nidification of Birds of the Indian Empire, Vol. III P. 403*".

"The nest hole varies somewhat; in hard soil it may be no more than 12 inches deep, while in sandy soil it runs up to about 4 feet. Adam records one seen by him in the banks of the Jumna as 7 feet deep, but such, I think, is quite exceptional. The entrance is from 2 inches wide (Brooks) to nearly 3; generally, I think, it is fully 2½. The chamber measures about 6 by 6 to 8 by 8 inches and as usual with tunnelling birds, is not so high in proportion, more often under than over 5 inches.

"There is no nest in the true sense of the word but, sometimes, there is an accumulation of the undigested remnants of fishes. Some birds, in fact, feed inside their burrows, while other individuals do not, and the latter are more numerous than the former."

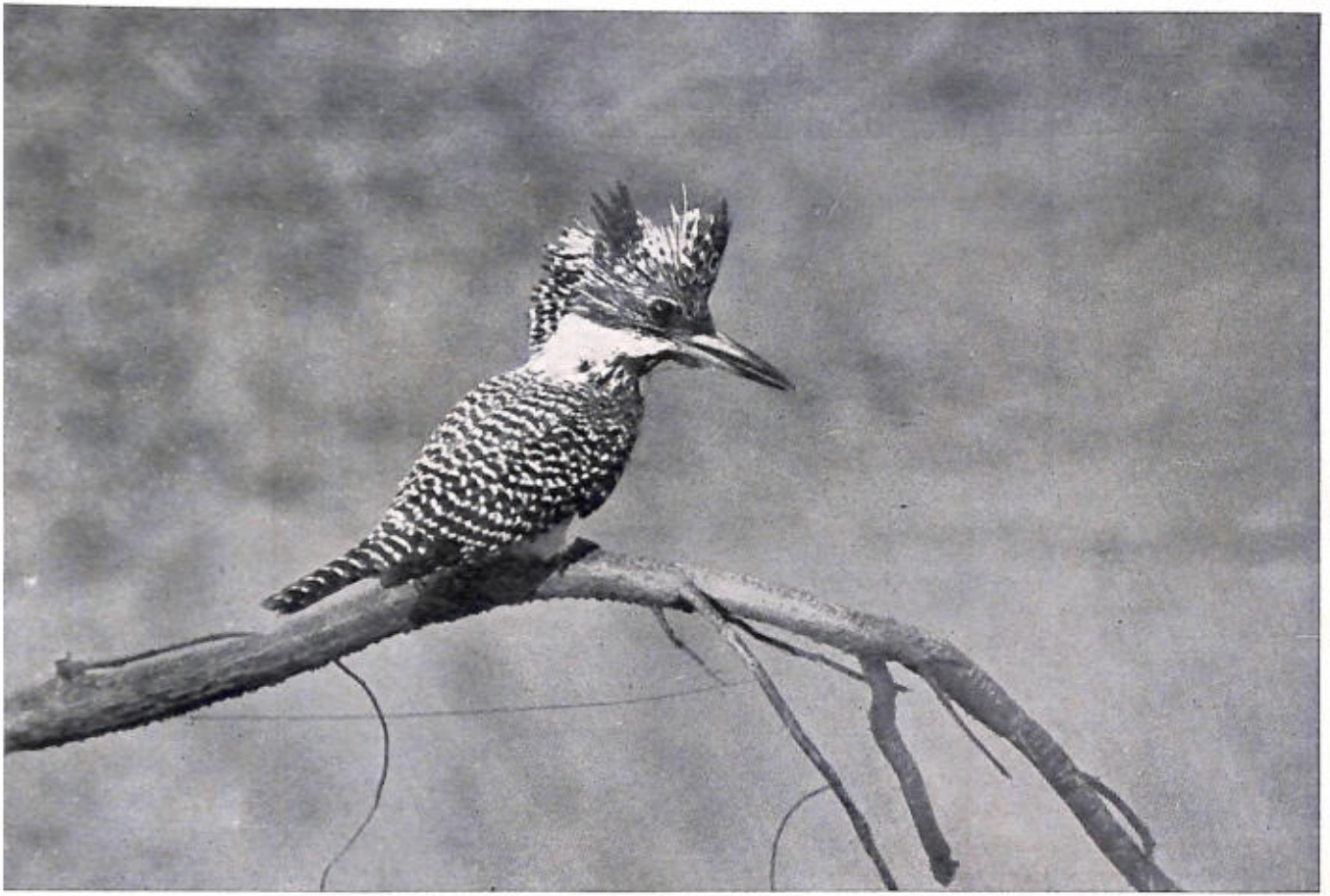
The same auther also remarks :—"Both sexes incubate and take a share in making tunnel and chamber, but I can find nothing recorded as to the period of incubation, I think it is fifteen days, but I am not sure. The fledgling time is from four to five weeks."

Colonel G. Marshall wrote to Hume "I imagine the young birds live with their parents some time after they are fledged, since late in the season I have noticed six or seven of these birds coming out of a single hole.

"I have noticed a curious fact about this bird ; it is a gregarious breeder. I have taken 3 sets of eggs from the same hole ; the hole led to a large open sort of cavern about 3 feet across, which was plentifully strewn with grass and rubbish, and the eggs were in different corners of it."

Another of Hume's correspondents, Mr. Benjamin Aitken sent to him the following most interesting note.

"At Akola, Berar. in either the end of January or the beginning of February, 1870, my brother took two out of six eggs from a Pied Kingfisher's nest in a river bank, about two feet above the surface of the water. Although the hole was much dug away, the birds continued to sit upon the remaining four eggs, which were duly hatched, and soon after the young were fledged the parent birds took possession of another hole near the first. That bank seemed to be their regular breeding place and was full of holes. Six eggs were again laid, and six young birds, looking exceedingly fresh and pretty, appeared in due time perched all in a row upon the top of the bank. Nearly a mile down the river there was a *bund*, and here of course it was easier to catch fish than at the nest where the water was running. So from early morning till late at night the parent birds continued making trips to get food for their young. Each little fish that was caught cost a flight to the



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THE HIMALAYAN GREAT PIED KINGFISHER
(Ceryle lugubris guttulata STEJNEGER*)*

bund and back of not much less than two miles, and the voracious fledglings seemed never to be satisfied. As soon therefore as the latter were able to go the distance, they were conducted to the bund where they could be fed with less trouble to the old birds and, I don't doubt, with more satisfaction to themselves. This arrangement was continued for several weeks, the whole repairing to the bund every morning and flying back to the nest in the evening. I regret I never took the trouble to watch whether they got into the hole to sleep." Stuart Baker adds to this. "I think we can say with certainty they did, as this is the usual custom with most Kingfishers."

They lay from four to six eggs, we have many times found both five and six, perhaps five is the usual clutch. They are very broad ovals, almost spherical sometimes, highly glossy and china white in colour They average 1·18 × 0·94 inches.

2. The Himalayan Great Pied Kingfisher.

Ceryle lugubris guttulata Stejneger.

Field identification.—A very large black and white Kingfisher found on hill streams up to about 4750 feet or more. Rather shy and crepuscular in habits. In winter found at foot hills and adjoining plains.

Description. No detailed description is necessary as Mr. F. W. Champion's beautiful photographs here reproduced show the black and white markings very distinctly. In the *male* the broad black spotted band across the upper breast is mixed with rufous-brown, this character does not seen to be constant.

Bill greenish-brown, blacker towards tip; iris dark brown, legs and feet greenish-plumbeous.

Length about 16 inches, wing 7·4 inches, tail 4·3 and bill 2·3 to 2·8.

The *female* differs in having the under wing-coverts and axillaries rufous-brown and in having no rufous on the gorget but one female in our collection shows some rufous-brown feathers on the sides of the lower-breast.

According to Stuart Baker *young birds* are like the female.

Distribution :—*Inside our area* :—In the hills Stevens writes in his "*Notes on the Birds in the Sikkim Himalayas*". Wherever this fine Kingfisher can get a sustenance, it is found on every river of consequence. In the Rungbong River, an odd pair or two reach the upper limits at an elevation approaching 4,700'. I have no information as to how far it penetrates into the interior by way of the Tista River; it has, however, been obtained on the "jhoras" in the lower portion of the valley up to an elevation of 1,200' (G. E. Shaw)." In the Duars it extends to the foothills and even many miles distant from those into the plains in the winter months. We have just secured one in the Moraghat Forest on the 29th November 1935.

Outside our area :—Stuart Baker gives the distribution as :—Himalayas from Kashmir to Assam, Burma from the North to Amherst in Tenasserim, Eastwards Forest obtained it in Yunnan." Delacour obtained it in Indo-China.

Habits etc.—The only good description of the habits of this bird is that given by Stuart Baker, many years ago, in the defunct sporting paper "*The Asian*" and reprinted in Hume's "*Nests and Eggs*". He wrote :—"As I have only taken one nest of this bird, I describe that in detail, others are sure to resemble it very closely. It was placed at the end of a hole excavated in a high bank, and placed at about three feet from the top and fully 20' above the level of the water. The tunnel, independant of the chamber at the end, was only about two feet deep; and as the soil was of a very loose, sandy nature, and quite without stones or pebbles of any kind, this would seem to show that this bird is not in the habit of burrowing to any great depth. *A. bengalensis* or *Ceyx tridactyla* (now *Ceyx e. erithaca*) would have made a tunnel fully six feet deep in such a place. The chamber, which was a very large one, was raised high above the entrance, the latter being fully eight inches below it. The nest was a mass of malodorous fish-bones, some of which were of considerable size, and had probably belonged to fish nearly six inches long. It was

hollow in the middle, the material of the nest being raised some way up the wall of the chamber on three sides. The eggs were four in number, white and round and of good size.

"The Cacharis tell me that, as a rule, it only lays two or three eggs, commencing to breed in May, but that this depends a good deal on the rains being early or late as they may happen to break. The nest taken by me was found late in July, and the eggs were very hard-set. The river, in the bank of which the nest was, was large enough to admit of small boats navigating it all the year round,

"This bird is exceedingly common on all large hill-streams up to a height of about 2,000 feet; above that it is not often met with, though on one or two occasions I have seen it flying about small streams at a height of nearly 4,000 feet, I think that it ascends during the breeding-season higher than at other times, for in the cold weather it is fairly common in the plains of Cachar; but during these rainy seasons, I have been on a visit to that district I have only seen one bird.

"They appear to be entirely fish-eaters, and are never seen away from water.

"Whilst waiting for fish they perch very low down amongst the scrubby bushes overhanging the edge of the water, and instead of selecting a twig or bough on the outside of the bush, they get as far inside as possible; their love of shade and darkness of course leads them in like manner to always keep the shady side of the stream. They are generally found in pairs and keep within hail of one another. When frightened they fly but a short distance, speedily resettling, unless the banks are very bare, when they continue their flight to the nearest convenient clump of shrubs. Their manner of taking prey from the water is by swooping down obliquely towards it, continuing their flight and not returning to their original perch. Occasionally they hover in the air when they are attracted by something in the water and drop almost perpendicularly into it; in such cases, however, they never dive to any depth, seldom immersing more than their head and neck.

"Their usual cry is much like that of all Kingfishers, but very loud, and uttered in a very quick succession of notes. Besides this cry it gives a low hoarse croak from time to time when seated in deep shadow, and this is, I think, the common call to its mate; at all events, when two birds are fishing in company and one of them utters this sound, the other bird always answers it. It is not a noisy bird on the whole.

"Its flight is extremely strong, and it is capable of going at great speed; but when not frightened or otherwise hurried, it seems to content itself with a sort of half-power speed, and goes along very lazily, slowly flapping its wings,

"This bird is the last of the kingfishers to retire to roost at night. I have sometimes seen it flitting about when it had become quite dusk. In flying at any distance the whole bird presents a grey appearance, merely the head appearing black from the feathers laying down close to the head. The crest can be raised by the bird at will, and when uttering the croak above mentioned it raises and depresses it two or three times with each cry.

"This bird, when it is succesful in taking a fish too big to swallow at once, often has to give up its capture to *Haliaëtus fulviventer (Haliaëtus leucoryphus,* Pallas's Fishing Eagle,. *Editor.*), which is a frequenter of the same streams as it haunts itself, and which is much given to living on other people and by other people's exertions, always preferring ready-caught fish to the trouble of hunting for them itself. The eagle, on swooping down, utters a loud vibrating cry, and, on hearing this, *Ceryle* drops the fish without the slightest hesitation, and, accelarating his speed, seeks safety for himself in the nearest cover.

As may be imagined, the shadow of any large eagle or hawk flying overhead is enough to reduce this bird to absolute silence; the other kingfishers appear, however, not to mind at all'.

In his *"Nidification of Birds of the Indian Empire Vol. III pp. 404, 405,"* the same author adds. :—"It is most

common between 1,000 and 2,000 feet in Assam, where it is seen over 3,000, but in the Western Himalayas it is common up to about 3,000 feet and has been recorded up to 7,000 feet.

"This kingfisher breeds in the banks of streams running through forest and always where the water is flowing bright and clear, in rapids and pools, but not in a rushing torrent. Stagnant and discoloured water is avoided altogether, and I have never seen it about forest pools and swamps. Hume found a brood of young birds in a hole in the bank of a stream near Subatoo, and this, with the exception of my own account of its breeding, is the only note in 'Nests and Eggs', as Thompson's note is valueless.

"Rattray once took a clutch of four eggs near Mussoorie on the 15th May. This also was in a large chamber at the end of a very short tunnel, similar to that found by Hume and others found by myself. Whymper, however, who has had greater success with this bird than anyone else, finding several nesting tunnels in the high gravelly banks of the Gola and Kosi streams in the Kuman below Nainital between 1,500 and 2,000 feet, describes the tunnels as long. In one he says that the tunnel was 8 feet long and in others 6 feet, although the soil was not exceptionally easy to work. They were all placed fairly high up in the banks, as were those Rattray and I found, and all the tunnels graded upwards towards the chamber, which was very large, measuring a foot or over each way and about 8 or 9 inches high. The tunnel entrance is over 4 inches wide.

"The eggs found by me, four in number, were lying on a mass of fish-bones exceedingly malodorous and, quite possibly, the remains of the food supplied to a previous brood of young. Neither Rattray nor Whymper found any bones in the egg-chamber, and it seems certain that these merely accumulate as the young are fed and throw up the undigested portion.

"The breeding season is undoubtedly March and April, Whymper obtained all his in these months, and Rattray's

eggs taken on the 15th May and mine in June were no doubt second layings.

"The full clutch is four or five, but the young seem to come to grief early, as one seldom sees more than two young birds with the old ones.

"Twenty eggs average 38·5 × 32·5 mm.

"There is nothing on record as to which sex incubates or digs out the nesting hole.

"The Cacharis informed me that this bird sometimes bred inside forests, making the nest-holes in banks, but I have never seen such. On the other hand, I have seen one nest-hole in the bank of a ravine just where it debouched into the stream itself."

Writing on the "*Birds of Kulu*", Whistler says :—"Its large size and black and white plumage and the loud call note 'ping' (similar to one of the calls of the Red-wattled Lapwing) readily attract attention as the bird flies along above the surface of the troubled waters or perches on the trees and boulders that afford handy fishing stations."

F. W. Champion in "*The Jungle in Sunlight and Shadow*," writes :—"On a branch above the pool is sitting a splendid Himalayan pied—Kingfisher, aristocratic and far larger relative of the common pied Kingfisher of the plains. He is gazing down at the water waiting his chance, and even as we watch he darts almost vertically down from his perch and plunges into the pool, only to rise again on missing his mark. He then poises over the water preparatory to a second dive and hovers in the same spot, maintaining his position by means of the rapid beating of his wings ; but he has not the skill of his smaller relative."

We give this note of Champion's as he found this bird plunging almost *vertically* into the water and hovering for a second time after missing its prey.

(To be continued.)

The Sun-birds and Spider-Hunters of our area.

By

C. M. INGLIS, F.Z.S., F.R.E.S., B.E.M.B.O.U.

(Continued from page 49.)

We now come to two Sunbirds very closely allied both of which are, we believe, found in our area. The following key will enable them to be identified.

Males.

Larger.—Breast bright yellow streaked with crimson ... ... Mrs. Gould's Sunbird.

Smaller.—Breast lemon yellow with no crimson streaks ... ... The Manipur Yellow backed Sunbird.

The females only differ in size.

3. Mrs. Gould's or the Simla Yellow-backed Sun-bird.

Æthopyga gouldiæ gouldiæ (Vigors).

Field identification:—A tiny bird with well curved bill, occurring from 4,000 up to over 10,000 feet, in which the males have the lower plumage yellow, streaked with crimson, the backs crimson and crown and tail metallic purple-blue. Mostly found in forest but also on cherry trees when in blossom, feeding on the honey and small insects.

Description:—The adult male is shown in our coloured plate and needs no description.

It measures about 6·2 inches; wing 2·2 and tail 3·6 inches.

The female has the upper plumage pale grey-green and the rump sulphur-yellow; tail brown edged with violet-green; lower plumage, to the upper breast, olive-green and below that yellowish-green.

The wing is said to measure 2 and the tail 1·4 inches.

Ticehurst remarks *(Journal Bombay Natural History Society Vol. XXXII)* "Juvenile. Like the female but tail not so graduated, nor tips so white. Complete moult September to December to full dress which is then retained all the year."

Distribution: Inside our area.—We have only one male of this Sunbird collected at Mangpu (3,800 feet), in the Darjeeling District, by Mr. Shaw on the 2nd November 1921, Stevens gives its distribution as :—

"Found at *all elevations of from* 4,000'—10,000' according to season."

Stuart Baker gives this race as occurring *above* 6,000 feet but the bird collected at 3,800 feet, seems referable to this race. It is too large for *isolata* and also there is red, though not well defined, on the breast.

Outside our area :—Stuart Baker gives the distribution of this Sunbird as :—

"The Himalayas from the Sutlej Valley to the extreme East of Assam, Naga Hills, South of the Brahmaputra above 6,000 feet and also Mt. Victoria, in the Chin Hills, from 6,000 feet upwards."

Habits etc. :—We have no experience of this beautiful Sunbird. Stevens records it as uncommon. He once observed it on the Mirik Ridge above Namsoo at 4,000 feet either in late March or early April. During March it appears to be found at elevations varying from 4,720 feet, where Stevens obtained a male at Gopaldhara on the 15th of that month, up to 10,160 feet where he secured a male and female on the 17th and two males on the 22nd of the same month at Kalo Pokhari on the Singalila Range. He has also found it at Gopaldhara in the first half of November and at this same period Shaw obtained his specimen at Mangpu at 3,800 feet.

Stevens writes in his "*Notes on the Birds of the Sikkim Himalayas* :—First arrivals which appeared immediately the cherry blossom opened. (This was on the 2nd November).

This Sunbird was much in evidence at this time, dwindling down gradually until the 13th of this month when the flowers had mostly set and the last bird had disappeared."

Stuart Baker, in the "*Fauna of British India, Birds 2nd edition, Vol III*", gives the following interesting note :— Mrs. Gould's Sunbird is one of high elevations, its place being taken from 5,000 feet downwards by the next race *isolata*. In the Himalayas it certainly occurs up to 12,000 feet and probably up to 13,000 feet in Summer, breeding up to 11,000 feet or higher (10,160 feet is the highest record we know of for our area). In winter it descends to 5,000 feet or lower and, at this season, both this and the next bird may be found in company at this elevation. They are extraordinarily active little birds on the wing, though their flight is never very prolonged and becomes jerky and weak after a hundred yards or so. They are shy birds but if one keeps absolutely motionless, they will often feed within a few feet of the watcher and they make a very beautiful picture when several gather together for feeding purposes, the rapidity of their motions being almost like that of a Sphinx moth. The note, which is constantly uttered, is the usual shrill trill of the species. They are essentially birds of evergreen forest but come more into open country in the non-breeding season.

Whistler says their note resembles the rapid opening and closing of a pair of scissors as is the case with *Æ. siparaja*.

With regard to the breeding habits Baker writes in his "*Nidification of Birds of the Indian Empire Vol, III*":— "During the breeding season these birds are found from 6,000 feet upwards to at least 12,000 feet, keeping to forest or to its outskirts.

"Tytler found it breeding commonly between 6,000 and 8,000 feet, generally nearer the latter elevation, in the Naga Hills, and sent me a beautiful series of eggs and nests. The nests are all exactly like those of *isolata* found by me in the Cachar Hills, which are fully described later on. These taken by Tytler were all affixed low down to the branches

of small bushes or brambles. The breeding season is June and early July and the number of eggs laid two only.

"The ground in all Tytlers' eggs is white, one pair is spotless but all the rest are thinly freckled with small blotches of pale reddish-brown, slightly more numerous at the larger end, and in one pair, the best marked, forming fairly definite rings.

Ten eggs average 14·6 × 11·2 mm."

4. The Manipur Yellow-backed Sunbird.

Æthopyga gouldiæ isolata Stuart Baker.

Field identification:—Resembles the last but for its smaller size and paler breast without any red on it. They are birds of lower elevations than Mrs. Gould's Sunbird though they may be seen together where their habitats meet. Stuart Baker says they keep to bushes and the lower half of small trees.

Description:—*Adult male*, in all respects similar to Mrs. Goulds' Sunbird, except for the much paler breast, more a lemon than a deep yellow, which is unmarked with crimson and also by its smaller size. Stuart Baker gives measurements as "Wing 51—53 mm. (53—58 in *gouldiæ*); tail 62—69; tarsus about 14; culmen 13—15. The measurements of the specimen which we consider belongs to this subspecies as compared with one specimen of *gouldiæ* is as follows.

	isolata.	*gouldiæ*.
Wing	54 mm. or 2·1 inches.	58 mm. or 2·2 inches.
Tail	66 „ 2·6 „	82 „ 3·6 „
Bill	15 „ ·6 „	16 „ ·7 „

The *female*, except for its rather smaller size, is indistinguishable from that of *gouldiæ*.

Distribution:—*Inside our area*:—This race was only separated in October 1925 whereas Stevens' account of the Sunbirds of our area appeared in June of that year so we are unable to state whether all his specimens belonged to

the typical race or not. The only specimen which we have secured, a male, was collected at Hasimara in the Duars, at about 500 ft. elevation on the 16th March 1926.

Outside our area :—The distribution, as given by Stuart Baker, is ;" Manipur, Cachar and one specimen from Mt. Victoria, in the Chin Hills. This latter was obtained at 5,000 feet, whereas all the red-breasted birds were obtained at 6,000 feet and over. Hume records Mrs, Gould's sunbird from Tippera and Chittagong and I am informed that it is not uncommon in the higher Hill Tracts of these districts. These are sure to be of this race and probably extend through all the lower hills and broken country to the Chin Hills."

Habits etc.—With regard to the habits and nidification of this bird, the same naturalist writes :—Similar to those of the preceeding bird. I found that when feeding they kept almost entirely to bushes and the lower half of small trees. (The only specimen we have was found feeding from the flowers of some shrub). This was very noticeable when, on one occasion, I watched them feeding with *Æ. s. seheriæ*, for though the latter were tempted by the flowers of some Bauhinias to hunt even the topmost branches, the Manipur birds kept strictly to the lowest branches. They are resident birds but many wander farther afield a little in the Winter."

"It is essentially a forest-bird, and breeds sometimes in glades and by river-banks in the interior of the forest and sometimes in among bracken and shrubs on the edge of cultivation patches. The nests that I have found have nearly all been attached to the stems of bracken and all very carefully concealed, being only a foot to 3 feet from the ground. One or two have been on thin branches of brambles or small bushes, but even these were in among bracken. They choose spots in which the old fronds of the previous year have not been burnt but surround and intermingle with the growing new plants, making it practically impossible to spot the nest unless the bird is watched onto it. The nest is roughly pear-shaped or oval and, at first sight, looks as if made only of pure white *Bombax* seed-down, but when

examined closer is seen to be held together with whisps of moss, grass-stems or a long brown fibre, possibly a fungus. In most nests there is not much of this visible but occasionally the outside is almost covered by it. The lining is merely the same cotton tree down but put in without mixture of other materials; at first it is very fluffy and soft but later, more especially when the young are hatched, it works into a sort of soft felt. The entrance is large and very near the top and without any porch. The nest is always pendent and the materials are well wound round the bracken stem, at which point only, moss, grass or fibre are used thickly mixed and strengthened with spiders webs. In size the nests vary greatly. The largest run up to 7 inches in length by about 2¾ in breadth at the widest part, while an unusually small one measured only 4·6 inches in height and 2·2 in width. The egg chambers measure roughly about 2 to 2¼ inches in diameter by about 2 inches in depth below the lower edge of the entrance.

"The breeding season is May and June and the last half of April.

"The full clutch of eggs numbers two or three, generally the former, while in appearance they are indistinguishable from those of the typical forms already described.

"I have, unfortunately, given away all my eggs but two without measuring them. These two measure 14·0 × 10·0 mm. but were, I think, rather on the small side. Measurements given by me in 'The Asian' newspaper nearly forty years ago were very roughly taken in decimals of an inch and are hardly worth recording.

"Both birds assist in building the nest, as I have seen the male carrying materials for it and I have also seen him carrying food to the young."

(*To be continued*)

Notes on Elwes' Eared Pheasant *(Crossoptilon harmani).*

Location.—Near NYENGO, Tibet, about half way up the Gokar La Pass. Altitude 14,000'. Latitude 29°25'N. Longitude 91°33'E. Date 21st August 1935.

Type of Country.—Steepsided mountain, thickly covered with several types of dense prickly bushes, stunted silver birch trees, herbs and grass from which large rocks protruded in abundance. Country very difficult to move over.

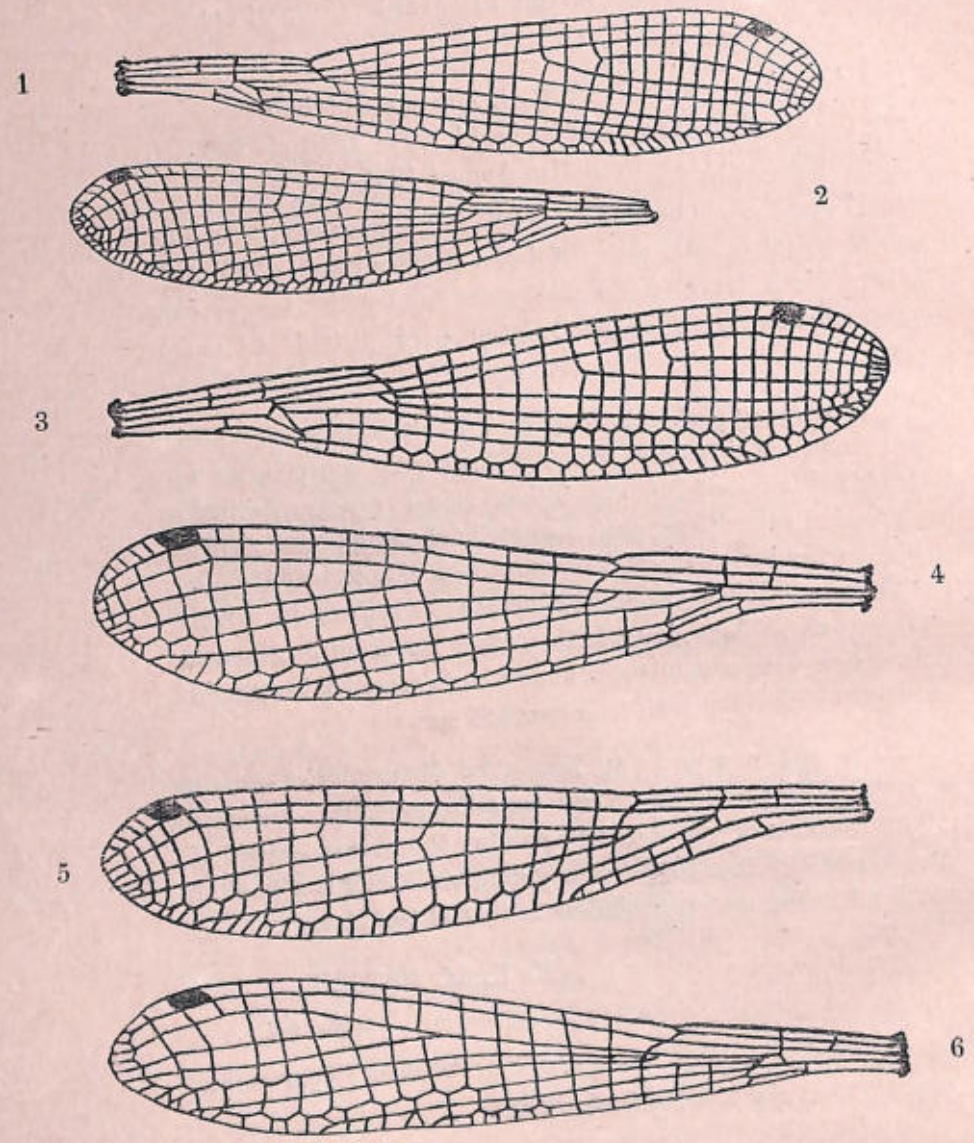
Habits noticed.—A covey of 7 adult and young birds was first seen sitting on a rock. They were conspicuous by their red legs and feet. When this covey was flushed a number of other *Crossoptilon* started "clucking" and showed this particular part of the mountain side to be swarming with them. It was not difficult to approach them to within 43 yards. When flushed they flew down hill. Amongst those seen were a number of young birds somewhat resembling black partridge both in colour and size.

The adults appear to have two distinct cries—one a "cluck" of alarm with a rather metallic resonance, and the other a communication call resembling the "come—back" of the domestic guinea fowl. The young birds' call is a kind of shrill whistling cry very similar to that of the Marmot.

R. K. M. BATTYE,
Captain,
Political Department.

Dated, Lhasa the 12th September 1935.

[We published a lengthy account of this bird in captivity in Volume IX, No. 4 of our Journal. *Editor.*]



EXPLANATION OF PLATE.

1. Wing of *Coeliccia*.
2. Wing of *Calicnemis*.
3. Wing of *Ceriagrion*.
4. Wing of *Copera*.
5. Wing of *Caconeura*.
6. Wing of *Aciagrion*.

The Dragonflies of the Darjeeling and Jalpaiguri Districts and Sikkim.

BY

Lt. Col. F. C. Fraser, I.M.S. (Retd.) F.R.E.S.

PART V.

(Continued from page 115 of Vol. IX.)

Subfamily Platycneminae.

Genus *Coeliccia* Kirby.

*14. *Coeliccia renifera* Selys. A slim black and sky blue species with long slender abdomen. Easily recognized by the broad blue on sides of thorax and a pair of large blue oval spots on its dorsum. In the female these spots are replaced by narrow humeral stripes and the blue markings by yellow. Found beside small streams and irrigation channels in plantations in the Darjeeling district. Usually seen settled on overhanging foliage and ferns. Mr. Chas. Inglis has taken it at Pashoke and Mr. H. Stevens at Gopaldhara. (Pashoke in May and Mangpu in September. *Editor.*)



Anal appendages of *Coeliccia renifera* Selys.

15. *Coeliccia dorothea* Fraser. Very similar to the last and distinguished from it by the dorsal spots smaller and by segment 9 of the abdomen pale blue instead of black. It is to be found in similar situations to the last in the Jalpaiguri district.

Genus *Calicnemis* Selys.

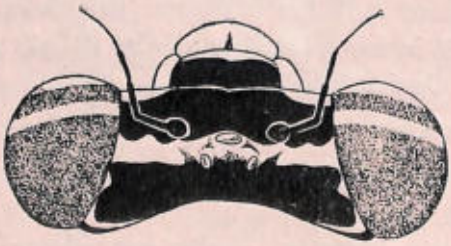
*16. *Calicnemis pulverulans* Selys. A smaller species than the last with shorter abdomen, coloured black marked with blue and, in the full adult stage pulverulent blue nearly all over. I found it quite common in bogs and marshy spots at the foot of hills around Mangpu, Darjeeling district. The female is black marked with yellow and is distinguished from females of other



Head of *Copera superplatypes* Fras., male.



Head of *Copera annulata* (Selys), male.



Head of *Copera vittata* (Selys), male.

species of *Calicnemis* by having the head entirely black behind and beneath. (Very common at Gangtok in May. Mangpu in June. *Editor.*)

*17. *Calicnemis eximia* Selys. Of similar size to the last and a very conspicuous insect with vermilion red markings on head and thorax and with abdomen entirely of this colour. The female resembles that of the preceding insect but has a small upper spot of yellow on dorsum of thorax and a broad yellow mark beneath the head. It is found in company with *C. pulverulans* and has similar habits. Mangpu in May and September. *Editor.*)

*18. *Calicnemis mortoni* Laidlaw. A rather larger insect than the last and with longer slimmer abdomen. It is to be distinguished by its abdomen black save the first three segments which are blood-red. An uncommon insect, found only in Sikkim. (Our only specimen, in museum, taken at Gangtok on 30th May 1924. We also took it at Pashoke. *Editor.*)

*19. *Calicnemis miles* Laidlaw. Resembles the last but the yellow spot beneath the head is larger and the whole abdomen is blood-red save for some small black markings on the end segments. A very rare species found in Sikkim. I have specimens from Upper Burma. Probably frequents rank herbage over marshy spots. The type comes from Sikkim.



Anal appandages of *Calicnemis miles* Laidlaw.

*20. *Calicnemis miniata* Selys. A very common species closely resembling the last but has black markings on the last four segments of abdomen and the whole upper surface of head is bright red save for a narrow

transvers black stripe between the eyes. In *C. miles*, there is a similar but much broader stripe largely obscuring the red. I found it in company with *eximia* and *pulverulans* around Mangpu, Darjeeling district.

(We got it at Badamtam in April, Pashoke In May and Kalijhora in June. *Editor*.)

Genus *Copera* Kirby.

21. *Copera annulata*. A slim species easily distinguished by its white and broadly dilated tibiae, especially the hinder pair. Coloured black marked with white and with long downwardly curved inferior anal appendages, the inferior being much longer than the upper. Found in the Jalpaiguri district around the borders of weedy tanks ; females are larger, more robust and are coloured black marked with reddish brown ; the tibiae are of the latter colour and not dilated as in the male. They are usually found lurking under scrub in the neighbourhood of tanks favoured by the males.



Anal appendages of *Copera annulata* Selys.

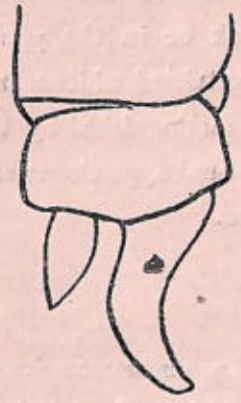
22. *Copera superplatypes* Fraser. A smaller species than the last, coloured similarly but with a narrow transverse white stripe on the head instead of a broad black triangle. Its anal appendages are also shorter and of about equal length, whilst the tibiae are enormously dilated as compared to the last species. A very rare insect from the Jalpaiguri district. Mr. H. V. O'Donel sent me the type, a male, from the



Anal appendages of *Copera superplatypes* Frase.

Duars, and this is the only specimen which has ever been taken. Probably found in similar situations to the last.

*23. *Copera marginipes* Rambur. A very common species found everywhere. Distinguished from the two last by the tibiae bright yellow or orange and not dilated. The sides of the thorax are pale yellow or blue mottled with black and brown. Young examples are pure white marked with black and are found in dark nullahs lurking beneath heavy scrub.



Anal appendages of *Copera marginipes* Rambur.

*24. *Copera vittata* Selys. A similar insect to the last with similar habits but less common. Distinguished by its anal appendages of which the superiors are just half the length of the inferiors, whilst in *marginipes*, the superiors are only one fourth or less this length. Found throughout the areas.



Anal appendages of *Copera vittata* Selys.

Genus *Caconeura* Kirby.

*25. *Caconeura o'doneli* Fraser. The only representative of its genus in the areas and found only in the Jalpaiguri district. It breeds in rivers and is found along the banks of streams or hovering over the surface of the water. Coloured black or in the young stage, with restricted white markings. Easily distinguished by the shape of its anal appendages and by its venation.



Anal appendages of *Caconeura o'doneli* Fraser.

Genus *Ceriagrion* Selys.

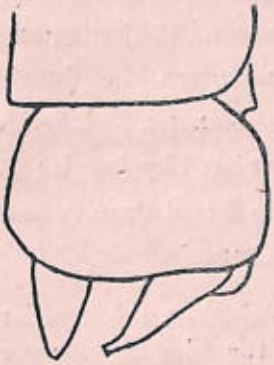
26. *Ceriagrion azureum* (Selys). An uncommon insect found in marshy spots moving stealthily about in long grass. Easily recognized by its entirely azure blue colour without markings. Occurs around Darjeeling and in Sikkim. Its apparent rarity is probably due to the scarcety of tanks suitable for their breeding places.

*27. *Ceriagrion coromandelianum* (Fabricius). A common insect in the Jalpaiguri district found along the borders of weedy tanks and among rank lush herbage. Thorax pale green, rest of body bright lemon yellow, unmarked. Females are more soberly coloured olive green with pale brownish abdomen.

*28. *Ceriagrion olivaceum* Laidlaw. Never found over or about water. Appears to leave its watery habitat at once to hide up amongst dry yellow grasses where it

is very inconspicuous by reason of its colour which is pale olive throughout. The sexes are similarly coloured. Very common, where found, in the Jalpaiguri district.

29. *Ceriagrion fallax* Ris. Closely resembles *coromandelianum* but has conspicuous black markings on the dorsum of end segments of abdomen and the thorax is a brighter green. Found throughout Sikkim at the lower altitudes in marshy spots.



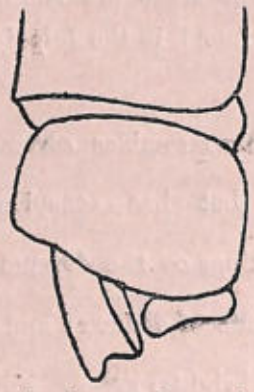
Anal appendages of *Ceriagrion fallax* Ris.

30. *Ceriagrion cerinorubellum* Selys. Found in all the areas over weedy tanks and marshes. Easily distinguished by the striking colours of its abdomen; segments 1 to base of 3 bright brick-red, segments 3 to 6 black on dorsum, blue laterally, segments 7 to the end bright brick-red. The sexes are similarly coloured. One of our most beautiful smaller dragonflies and common where found.

Genus *Aciagrion* Selys.

*31. *Aciagrion pallidum* Selys. An excessively slender and inconspicuous insect found lurking under scrub jungle or in dark mullahs. Sometimes it is found in large numbers in long dry grass with which its colour generally harmonizes. Thorax fawny with obscure diffuse pale blue stripes; abdomen fawn, marked dorsally with black. Found in the Jalpaiguri district.

*32. *Aciagrion olympicum* Laidlaw. Of similar size but of more robust build to the last, coloured blue and black. Segments 8 to 10 azure blue, the last segment with a black X—shaped mark on dorsum. Found around Darjeeling and not uncommon in jungle around Mangpu, alongside paths bordered by jungle; it seems to breed there in irrigation channels.



Anal appendages of *Aciagrion olympicum* Laidlaw

33. *Aciagrion approximans* (Selys). A much smaller insect than the last and with the blue colour more restricted. Usually found in swarms in damp spots or over marshes generally away from jungle. Found in all hilly districts but very local.

(To be continued.)

Observations on Centipedes, Hairy Caterpillars, Monitors and Geckoes.

By

Col. H. S. WOOD, I.M.S.

(Continued from page 69)

3. Geckoes.

Every one in India is familiar with the smaller variety of Gecko which emerges at the beginning of the hot weather, after its winter sleep. They spread themselves on the walls and ceilings of houses, when the lights are on, clinging on with the suckers on their feet, and making war on almost any kind of insect. It is interesting to watch them stalking their prey. When at a little distance the tongue is shot out

and the victim secured. It is amazing what large moths the Gecko can swallow, the mouths and gullet, like those of a snake, being capable of great expansion.

When two Geckoes are about to fight they lash their tails when approaching each other ; they come to grips and generally fall on the floor sometimes losing their tails. The tail, though it grows again, is never such a nice looking one as the lost one as it very often grows at an angle to the rest of the appendage.

The Indian name for the House Gecko is *tik-tiki* probably given to it on account of the sound it makes which resembles the ticking of a clock.

The skin of this small lizard is very thin and semi-transparent so that all the organs can be seen, including the pulsation of the heart. The general colour is a pinky white, the two glistening beady eyes being very prominent. The Gecko is capable of changing its pinky colour to a darker shade, much depending upon the amount of light and its surroundings. I have seen specimens a deep black colour.

In Winter the Gecko hibernates in holes and cracks in a wall. The eggs are round and have a very thin shell. I have hatched out the young by placing the eggs in a box with cotton wool. When hatched the young are jet black and the head is very large in proportion to the body.

I noticed in Mesopotamia that the Geckoes were very large but everything runs big in Mespot. The ducks or Black partridge are larger and heavier than those found in India, even the Sparrows are large and very destructive to gardens.

The Mesopotamian Gecko feeds almost entirely on sand flies, as moths are few and far between, and is very useful in keeping down these pests.

The *Tuck-too*, or Large Gecko, is found in large numbers in Assam and Burma. I have never heard its call in any other part of India but I fancy it is found in Travancore and Coorg and possibly Malabar. The Burmese are very

fond of the Tuck-too. They never kill them like the ordinary native does who considers them poisonous. As a matter of fact the Burmese maintain that their presence in a house brings luck. The Tuck-too is very often heard in rest houses and deserted buildings and in the forest they occupy some giant tree that is doomed through the ravages of ants and decay.

The sound *tuck-too* is repeated several times, it may be 7 or 11, and is said to alter according to the age of the lizard, at the finish there is a sound in a deep guttural note like a groan. I do not believe the theory that the older the lizard the greater number of notes are uttered. To my mind it is a beautifiul sound and has helped to while away the time when I have been sitting up for a Tiger. In the forests the call of one is taken up by others like the call of the Crow Pheasant. They generally call at dawn and dusk but I have heard the sound in the day. When they are particularly vociferous it is a sure sign of rain.

Although not poisonous, the bite from a Tuck-too, like that of the Monitor, may produce some laceration and septic inflammation may follow. They can bite very hard and before handling one it is advisable to put on a thick kid glove.

Wishing to rid our house of cockroaches, and loving the Tuck-too as I did, after retirement in the North Cachar Hills, I purchased some. I got some Nagas to collect a few and one day a man appeared with seven inside a hollow bamboo, I got a ladder and deposited them one by one in the roof of our house. They bit fiercely at my glove and, in the struggle, part of the tails came off and lay wriggling at the bottom of my ladder.

We made great friends with our Tuck-toos and they used to come out on the beams of our verandah, in the evenings, when the lights were lit. One of the Tuck-toos was much larger than the others and had a splendid voice so we called him Caruso. We fed him with cockroaches and moths impaled on a piece of wire. One day he got a prick on the nose, from the wire, and after that wasn't taking any. He drove all the other Tuck-toos away and

became sole possessor of our domain. He made a clear sweep of all cockroaches and other noxious insects in our house.

It is said that the Tuck-too eats the eggs and young of sparrows and mynas. I cannot vouch for this but I, once, turned out a *Tuck-too* from an empty sparrow's nest and it certainly *looked* as if he had devoured the contents and made the nest his bed.

The Tuck-too can change its colour very rapidly to fit in with the surroundings. At times ours were a light green colour, especially in daylight, at other times dark, but their markings were always evident. It is sturdily built and its head is very like that of a croc. I have never found their eggs.

In conclusion it is rather interesting to study the tongues of the various *reptilia* I have described. The Monitors have forked tongues exactly like those of a snake. This is used for drinking water and lapping up the blood and juices of its prey, frogs, tadpoles etc.

The Geckoes have fleshy tongues which are covered with a sticky saliva. These are capable of a considerable amount of protrusion and the movement is so rapid that one can hardly see it when the creature is about to seize its prey. I may mention here that the frog and the toad have a tongue which folds on itself and it acts just like a fly-flap. In the chameleon the tongue has a cup-shaped extremity, and, no doubt, suction forms an important part enabling the creature to hold its prey. It is curious to note that in the chameleons the two eyes are independant of each other in movement ; for instance one eye may be looking upwards and the other downwards, or one may look forwards and the other backwards. This is very convenient and gives the animal a wide range of vision. The reason for this is that each optic nerve goes straight to the brain, they do not cross behind in a commissure such as exists in most animals and birds. In these days of motor car accidents, the chameleons arrangement of eyes would be most beneficial to the human race but the æsthetic effects would be terrible as everyone would have a bad squint.

When the reptiles had a third eye at the top of the head, the rudiments of which are only now found in the Tuatera lizard of New Zealand, the range of vision must have been enormous and of great advantage in seeing its enemies.

[The Monitors are most interesting creatures the earliest records for the family are from the Eocene of Wyoming and of a later date Lydekker has described, from the Sewalik Hills, bones of fossil forms larger, but otherwise identical, with present day species.

Six species occur in India and Burma. In the latter country, species are especially abundant, five out of the six being found there; the other one being confined mostly within this country to the desert regions of N. W. India. Colonel Wood is probably correct in saying that two species are found in Assam, the same being found within our area. The Common Indian or Bengal Monitor (*Varanus monitor*, Linn.,) and the Water Monitor (*Varanus salvator*, Laur.,) All Monitors are carnivorous and, as Dr. Malcolm Smith says, "they are usually prepared to devour animal food of any kind that they can overcome; indeed, it is astonishing considering the non-distensible nature of their jaws what large prey they can swallow. Birds and their eggs, small mammals, reptiles, fish, crustaceans and even large insects are all readily devoured and they are not averse to eating carrion. *Varanus salvator*, when it lives on the coast, spends much of its time hunting along the shore when the tide is out in search of crustaceans and molluscs."

When attacked the Common Monitor, and probably the others as well if they cannot escape, raise themselves and inflate themselves with air which they expell with a loud hiss or, as Mr. H. C. Smith, of the Burma Forest Service, describes it, like a "noise resembling that made by dragging a tarpaulin or tent along the ground," they lash out with their tails and less often use their teeth with which they can give an exceedingly severe bite and are most tenacious when they once get a good hold. Although their claws are powerful they seem to make no use of them when attacking or defending themselves. Colonel Wood mentions finding

Monitors apparently dead and thinks the reason may be due to their suffering from a form of sleeping sickness. Mr. H. C. Smith has found them lying "absolutely motionless in the open on the ground or against the bare trunk of a tree, and, when behaving thus, they can often be picked up by the tail or will allow a noose at the end of a long pole to be slipped over their heads." He gives the reason for this, that they thus hope to escape observation or capture. Is it not possible that Colonel Wood's Monitors may have been doing the same ?

The eggs as well as the flesh, are considered great delicacies bp the Burmans and others. In fact in such great esteem is the flesh that Mr. H. C. Smith says "A Burman will think nothing of felling a valuable tree of five feet girth in order to bag a 'Phut' which has taken refuge inside it." The same author has the following interesting remarks on this species in Burma. "When captured they are generally found to have numerous ticks adhering to them which, in colour and shape, very closely resemble the lizards' scales.

"The *breeding season* of the Common Monitor is said to be during the hot weather, *viz.*, the end of March and April. It is said to commence breeding in its second or third year when it has attained a length of about 2 feet 6 inches or 3 feet. It deposits its eggs, which are white, oval, soft-shelled and often as 25-30 in number, in a hole in an ant-heap. The eggs are separate from each other and not stuck together like snakes' eggs. They are laid usually early in the hot-weather. After depositing her eggs, the female 'Phut' closes up the hole with leaves, rubbish etc., and departs.

The food of these monitors consists of small mammals, birds, fishes, frogs and eggs. They will eat raw meat in captivity. They are capable of existing for a considerable time without food and will gorge themselves when opportunity arises. They are known to be very destructive in poultry yards, but the damage done in this way is believed to be more than counteracted by the amount of good these reptiles do by devouring large numbers of rats and mice

which would otherwise destroy field crops." The eggs are said to be deposited in September in the Central Provinces.

This Monitor has been found as high as Darjeeling.

With regard to the Water Monitor this is more aquatic being found near streams and rivers and also the sea coast but, according to Mr, H. C. Smith, it can, apparently", exist for long periods in dry regions without any water at all." He says, "specimens 6 feet or more in length are frequeuntly seen dashing across the Mandalay-Maymyo main road in front of motors." He once came across one floundering about in a small pool in some very dry forest. It was a 5 foot long female and when captured a live frog leapt out of its mouth. When the Monitor was opened out "its stomach was found to contain no less than forty more frogs, none of which were particularly small. The lizard was absolutely gorged." It takes to water when disturbed and can remain submerged for sometime and has been seen far out at sea. It climbs well and can travel, on land, at a good pace. Mr. H. C. Smith says that they lay from 25 to 30 eggs at the beginning of the rains and these are usually laid in holes in trees near or overhanging water." Dr. Malcolm Smith says the eggs are said to taste like turtle's eggs and that the flesh of this is not usually eaten. Besides fish and frogs he says it is very fond of eggs and is also destructive to poultry and probably other birds and small mammals.

Geckoes.—When Geckoes lose their tails very often abnormal tails, bifid or trifid, are reproduced ; the new tails too have a simpler form of scaling than in the old ones. These Geckoes have highly developed, adhesive digital pads which enable them to climb perpendicular walls and run along ceilings.

House-Geckoes are often transported in ships with the cargo and as they can go without nourishment for long periods this assists them very considerably.

The number of eggs laid by Geckoes is usually two, more are often found but these have been laid by several parents ; some lay two clutches in the year. As many as

186 eggs have been recorded as laid on a single window shutter in Canton. The House-Geckoes often lay them in drawers or small boxes and others according to Malcolm Smith "under stones or logs or in crevices of wood." After she has laid her eggs she leaves them to hatch out.

With regard to their habits Malcom Smith writes; "Their chief food is insects but the larger species will devour anything they can overcome. Some of the House-Geckoes will take grains of rice and they also appreciate sugar. Water is taken by lapping it up with the tongue, and they are said to consume large quantities when they can get it. House-Geckoes can be readily tamed and will learn to come to the table and take food from the hand. Most of them are nocturnal in their habits, but their activities are not confined to the darkness ; on dull days or in shady places most of them are prepared to feed at any time.

All the Geckoes have a voice, usually it is a soft chirruping or clucking sound such as we can make with our tongue, but some of the larger forms snch as *Gecko gecko*, have a loud cry that can be heard a considerable distance away, Many of them squawk when captured.

All Geckoes cast their skins at intervals. This may be done in one piece, when it is often swallowed, or it may come away in flakes."

Dr. Malcolm Smith has some most interesting notes on the Tuck-too which we transcribe for the benefit of those of our members who have not access to his latest Fauna Volume on "*Replilia and Amphibia ; Vol. II, Sauria*" :—

"The Tokay, Tuk-Kaa or Tuck-too is well known to the inhabitants of the towns of Southern Indo-China. Most houses of any size accomodate one or more of these large lizards, which hide in holes or crevices, generally near the ceiling, during the day, and come out and run about on the walls in search of food as soon as the sun goes down. Each individual usually has its own particular hiding place and also its own beat, upon which others are not allowed to encroach. Its popular name is derived from its call,

which is remarkably loud and clear and can be heard, if the surrounding conditions are quiet, at least 100 yards away. Each call consists of a preliminary cackle, and then the sound "tuk-kaa" repeated deliberately and distinctly several times, finally capped by a low gurgle. The calling is not continued throughout the whole year. It commences about the middle of the cool weather (December), becomes more frequent as the hot weather approaches, and is at its maximum during March, April and May. During these months they can be heard calling frequently, sometimes all through the night, one lizard after another taking up the cry from house to house. After these months they call less frequently and during the autumn are usually silent.

They feed chiefly upon insects, but are prepared to tackle anything that they can overcome. The smaller House-Geckoes, smaller birds and snakes, fall victims at times to this voracious creature. Flower (1899) records two instances, and I know two more, of a long-drawn-out contest between a full grown *Chrysopelia ornata*, a common house-snake in Bangkok, and *Gekko gecko*, but in these instances the snake was presumably the attacker, and was the victor. The fight lasted between one and two hours, each animal holding the other firmly in its jaws. Curran records a fight between this lizard and a Rat-Snake which lasted for three hours, and would not have terminated then had not the opponents been disturbed. I have seen this Gecko, when cornered, stand at bay with its mouth widely open, and finally rush at the person and seize him. Its jaws are extremely powerful, and when once it has taken hold is not easily detached."

The scientific name of the Tuck-too is *Gekko gecko* (Linn).

Colonel Wood mentions the Tuatera. From "*Wild Life of the World*", by the late R. Lydekker, published by Messrs. Frederick Warne and Co., we find the following interesting remarks which we quote:—"An apparently insignificant New Zealand reptile resembling a rather large lizard in general appearance is one of the most interesting animals in the whole world, for it is the last survivor not

only of a family, but also of a distinct ordinal group, well represented in past epochs of the earth's history. To call this reptile, of which the scientific designation is *Hatteria punctata*, a lizard is a misnomer, for it has nothing to do with that group, and it is therefore much better that it should be known by its Maori name of tuatera. Although it formerly occurred on the mainland, where it was probably killed off by pigs, the tuatera is now confined to two small islands off the coast of the North Island, where it is yearly becoming scarcer. Measuring about 18 inches in length, the tuatera is easily recognised by the row of horny spines running from the crown of the head to the tip of the tail, where they become reduced to knobs. It is to the presence of these spines that the reptile owes its native name. Tuateras spend most of the day in sleep, and feed on animal food, which they capture alive. Between November and January the females lay about half a score of long, oval, white, hard-shelled eggs, which are deposited in holes in the sand where they can be reached by the sun's warmth. Tuateras, are, as a rule, slow and sluggish in their movements, and are capable of remaining hours under water without coming up to breathe. They excavate their own burrows, the accommodation of which is generally shared by a pair of petrels, and the terminal chamber measures only some 18 in length by 12 inches width and 6 inches height.

"The palate of the tuatera is armed on each side with a double row of closely approximated cutting teeth, between which bite a very similar row of teeth surmounting the sharp-edged lower jaw. Skulls of the same general type, but in some cases of much larger size and with a more complex type of dentition, are met with in the Trias formation of Europe and India, and have been described under the name of *Rhynchosaurus* and *Hyperodapedon*. These extinct tuateras attest the antiquity of the type of which the New Zealand species is the sole survivor. There is, however, other evidence of the antiquity of the Rhyncocephalia, as the order to which all these tuateras pertain has been named. For if the head of a New Zealand tuatera is carefully dissected, it will be found to possess distinct remnants of a

median Cyclopean eye; a structure which, judging from the aperture of the bones in the forehead for its reception, appears to be common to a large number of extinct reptiles and salamanders." *Editor.*]

Notes on a special method of making butterfly pictures.

We cull the following from the *"Proceedings of the Royal Entomological Society of London Vol. X Part. 1 of 27th June 1935"*. Some of our members may care to try their hands at making these pictures. The notes are by Mr. L. G. O. Woodhouse of the Surveyor Generals' Office, Colombo, Ceylon.

Editor.

"Collectors in foreign countries are often handicapped by the lack of good illustrations of butterflies, obtainable at reasonable cost, by which to identify their collections.

"The method of simultaneously transferring the scales from both sides of butterfly wings on to gummed or waxed paper, has been known for many years, and I found it a most useful and handy method for making good and accurate pictures for ready reference, provided the butterfly is not a rare one, and a duplicate can be spared from the collection.

The following is a brief outline of the method, I have adopted :—

"A piece of good white paper is folded in half and then gummed or waxed; having carefully cut off the fore-and hind-wings from the same side of the butterfly, place them on the gummed or waxed paper; fold it over, and then place it on a very hard, smooth surface—such as a piece of flat glass or china. Each side of the folded paper is then very firmly, but evenly, pressed with a very hard tool—such as a wooden roller. If gum is used the pressure will have to be applied quickly, before the gum has dried. The folded paper is then carefully peeled apart, and the wings now wholly or partly denuded of scales, carefully removed.

Although surprisingly good results can be achieved, it is evident that the scales have been reversed, with the result that the pictures are very disappointing with such families as the Lycaenids and Papilios.

"With the help and advice of my friends, Mr. J. V. Collins, M.A., SC.M., F.I.C., the Ceylon Government analyst, and Mr. G. M. R. Henry, of the Colombo Museum, the following method has been evolved :—

"The scales are first pressed off on to waxed paper, which is then carefully stuck on to a piece of gummed paper, and left to dry completely, after which both papers, closely adhering to each other, are immersed in a bath of petrol (which dissolves the wax but which does not affect the gum).

"I am calling the single process the 'Gum' method and the double one the 'Wax-cum-Gum' method and have described each in detail below".

DESCRIPTION OF THE "GUM" METHOD.

Tools required.

Forceps for handling the butterflies and their cut-off wings. A sharp-pointed pair of small scissors for cutting the wings off the bodies. A finger-bowl with which to cover the cut-off wings, in order to prevent their being blown away. A good brand of white paper. Some large pieces of gum arabic, dissolved in water and carefully strained so as to be as thick, but clean and transparent, as possible. A couple of stiff-haired brushes for covering the paper as quickly, evenly and thinly as possible. A hard surface, such as plate glass, on which to press off. Some hard article—a bone tooth-brush handle—with which to press off. A good sharp knife.

The "Gum" process.

(i) Very carefully cut off one side (fore and hind-wings) of the butterfly, as close to the body as possible, and place the two wings under a finger-bowl. (ii) Cut off a rectangular piece of the white paper, sufficiently large to cover

the *whole* butterfly had it been properly set. (iii) Carefully fold the paper in half and open it out again for gumming. (iv) Correctly gumming the paper is most important and makes or mars the picture. The gum must be applied with a brush as lightly and evenly as possible; if it is uneven, or too thick, the scales will coalesce and the picture will be hopelessly blurred; if there are patches with little or no gum the scales will not adhere to the paper. (v) With the forceps place the wings in position on half the gummed paper, and fold the other gummed half over them. (vi) As firmly and evenly as possible, press on the folded paper with the hard article on the hard surface, turning the folded paper over so that both sides are evenly pressed and the scales come off from both sides of the wings. (vii) Carefully peel the folded paper apart when the now diaphanous wings, both sides of which have been wholly or partly denuded of scales, can be picked off with the forceps. *Note:* The application of the gum to the paper and the subsequent operations (v), (vi) and (vii) should all be done as quickly as possible before the gum has dried. (viii) When the gum is dry, the transfer can be carefully cut out and pasted on to a suitable mount—white or coloured—and correctly spaced so that the body and antennae may be drawn in against the upperside. The name of the butterfly, locality and date of capture must, of course, be carefully recorded on the mount, which I protect with a piece of tracing paper.

The following are a few remarks on the "Gum" method.

"It will be evident that when this process has been completed, the scales in the transfer pictures have been reversed, but this does not seem to matter for some families—Nymphalids, Pierids, Hesperids, etc., in which the scales are presumably the same colour and texture on both sides. In the majority of cases these transfer pictures are more accurate and reliable—both for colour and detail—than ordinary coloured reproductions. But in the case of the Lycaenids and some Papilios, etc., the colours are incorrect. In some species, *e.g.*, the Charaxes, reversing the scales brings to light wonderfully delicate sheens of beautiful and

varying hues which are certainly not perceptible in the real butterfly wing. In other butterflies—the Danaids, the Pierid—*Pareronia valeria ceylonica*—and certain of the Papilios—*alcibiades, nomius, doson, teredon, agamemnon*—some of the coloured scales are replaced by a pigment in the membrane of the wings, so that the colour transfer of that part of the wing is not possible. Two pictures can be made from each complete butterfly; or if one side is damaged, instead of discarding the insect one good picture can be made from the undamaged side. In some cases, *e.g.* yellow Pierids, the chemical action of the gum gradually makes the colours dingy and dull. This might be counteracted by mixing the gum with an equal quantity of a saturated solution of aluminium sulphate. I have found that the best results are obtained from fresh specimens, *i.e.*, if the transfer is made within 24 hours of capture; but quite good transfer pictures can be got from old specimens, which, however, must be carefully "relaxed."

"To sum up, the "Gum" method at its best, produces pictures which are not only very accurate in outline and detail, but the colours are correct in depth and tone; and at its worst, produces an accurate outline of form and detail. Between 1924 and 1929 I made "Gum" pictures of almost every one of the 233 known Ceylon butterflies, which I found most useful in England in 1929 when I arranged my Collection, which I had sent home ahead to be set and kept for me.

"Very striking and beautiful results can be obtained by using waxed, instead of gummed, paper, but the wax transfers are not so easy to mount, and being much more fragile and liable to melt in heat, are more difficult to keep intact.

Description of the "Wax-cum-Gum" Method.

Tools required.

In addition to the items mentioned above, the following are required—

"A device for exerting very considerable pressure—I use an old, iron, copying letter-press.

"Good waxed paper, which I have had great difficulty in procuring. Various kinds of white and coloured papers — thick and thin. Blotting-paper.

The "Wax-cum-Gum" Process:

(i) "Very carefully cut off one side (fore-and hind-wings) of the butterfly, as close to the body as possible, and place the two wings under a finger-bowl. (ii) Cut out a piece of rectangular waxed paper, sufficiently large to cover the whole butterfly had it been properly set. (iii) Carefully fold piece of paper in half and open it out again. (iv) Place the paper in position on a large piece of blotting paper, which will subsequently be folded over. (v) Place the wings carefully in position on half the waxed paper; fold the other waxed half over, and enclose the waxed paper in the blotting-paper. (vi) Then very carefully insert the whole in the iron, letter-copying press and apply as much pressure as is possible. The blotting-pad should then be carefully extracted and the tooth-brush handle or wooden roller used for both sides on the hard surface, and a final pressure by the copying press applied. (vii) Peel the folded waxed paper apart, when the now diaphanous wings, both sides of which have been wholly or partly denuded of scales, can be picked off with the forceps. (viii) Each waxed transfer is then carefully stuck on to a piece of paper, on to which a liberal but even application of dissolved gum arabic has just been made; very little pressure is necessary—just sufficient with the fingers, to press out any air bubbles; the gum must be allowed plenty of time to dry (I always leave it for 24 hours at least) in between the blotting-paper, which I insert in an old magazine with sufficient weight to keep the gum and waxed paper quite flat. (ix) When convenient, but never less than 24 hours after stage (viii), the waxed paper can be separated from the gummed paper by immersion in a bath of petrol, which dissolves the wax but does not affect the gum. (x) Before putting the gummed paper to dry, immerse it in a fresh petrol bath in order to wash all wax away. (xi) When the petrol has completely evaporated from the gummed paper the transfer may be carefully

cut out and pasted on to a suitable mount and correctly spaced so that the body and antennae can be drawn in against the upperside. The name of the butterfly, locality and date of capture must, of course, be carefully recorded on the mount, which I protect with a piece of tracing paper.

The following are a few remarks of the "Wax-cum-Gum" Method.

"In some of the more brilliant and varying-hued butterflies the wing-scales may be compared to minute reflecting, but uncoloured, lenses or prisms which must be the right way up to reflect and refract the light rays. Consequently, the single "Gum" process is a failure, whereas the double "Wax-cum-Gum" one produces a transfer picture which surpasses any other of which I am aware. By varying the colour of thickness of the paper on which the gum is applied (viii) great improvements can be effected. For instance, if thick dark brown paper is used for the uppersides of *Papilio crino*, and *Lampides bochus*, *Tajuria longinus*, etc., the resultant transfer picture can be very favourably compared with the actual wing. I use grey or brown-tinted, thin paper for *Spindasis*, and before pasting the gummed paper on to the mount, I colour, on the reverse side, the black-tipped wings, which enhances the velvety look. To get the best effect for *Hestia jasonia* I use the best Air-mail white paper and pick out the spots in black, on the reverse side of the gummed paper, before pasting on its mount. Similarly for such Pierids as *Delias eucharis* and its well-known mimic *Prioneris sita*, I use very thin white paper and colour the red marginal spots on the reverse side of the under wing which show through pink just as they appear on the actual wing.

By using very thin paper the difficulty referred to in (ii) above can be overcome by colouring on the reverse side.

"In the "Wax-cum-Gum" method the butterflies must be completely dry, or the juices will spoil the wax transfers. I have obtained perfect results from specimens taken 18 years ago, and which the collector was going to throw away; it is of considereable advantage to be able to wait and utilise

old specimens from a collection which has been replenished by fresh ones. I see no reason why butterflies captured 50 years ago should not make good pictures provided the insects are well preserved and in good condition.

"The pictures take up little room and are available for ready reference. I have found them excellent for lecture purposes and they seem unaffected by the heat of an epidiascope.

"I would emphasise that I do not wish to imply that butterfly pictures made in the "Wax-cum-Gum" method can take the place of any well-set, perfect insect. But for amateur lepidopterists, who have to spend most of their working lives in a tropical climate, it is heartbreaking to see beautiful specimens being ruined by mould and mites, and if chemicals are used as a deterrent in store boxes the insects quickly lose their colour and sheen.

"I keep the rubbed-off wings, bodies and all the "spare parts" labelled and indexed to my pictures and I venture to think that this somewhat unique collection may be of some practical help to the "cabinet', naturalist, to which I humbly aspire when my official work in Ceylon is done and I retire home to England.

"In conclusion, I realise only too well that the "Wax-cum-Gum" process is not by any means perfect and I hope that anyone interested will work in conjunction with me and exchange ideas for our mutual benefit."

DARJEELING NATURAL HISTORY SOCIETY.

The Society was started about the end of 1923, the objects being to maintain the Museum in a proper condition; to promote the study of Natural History and to get together, as complete as possible, collections of Natural History specimens from a limited area, including "the civil districts of Jalpaiguri and Darjeeling and the State of Sikkim", as well as what could be procured from the neighbouring countries of Tibet, Bhutan and Nepal.

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TURDOIDES SOMERVILLEI TERRICOLOR
The Bengal Jungle Babbler
The Creeper with the red seeds is Abrus precatorius

JOURNAL

OF THE

DARJEELING NATURAL HISTORY SOCIETY.

Vol. X.—No. 4.

The Bengal Jungle Babbler or "Seven Sisters."

Turdoides terricolor terricolor (Hodgs.)

(With a coloured plate).

The subject of this paper belongs to that large family of birds called *Timaliidæ*, of the Order *Passeres*. In this family the wings are rounded, the legs very strong and the plumage of the nestling is like, though paler than, that of the adult female. This family is subdivided into three subfamilies, *Timaliinæ*, *Sibiinæ*, and *Liotrichiinæ*. The Jungle Babbler belongs to the first of these, in which the sexes are alike ; the legs and feet very powerful ; the wings weak and rounded and the habits mostly terrestrial. The *Timaliinæ* is divided into thirty-five genera, our bird belonging to *Turdoides*, in which the nostrils are more or less covered by plumes ; the feathers of the head short and the tail about the same length as the wing and well graduated.

In *Turdoides* there are eight species and subspecies only one of which occurs with us.

Field identification :—An earthy-brown bird, about the size of a Myna, whose wings and tail hang loosely while hopping about the ground, turning over leaves in search of food. Very common in gardens especially about shrubberies or in the waste land round villages etc.

Description :—As the coloured plate shows this there is no necessity to give any separate description. Sexes alike. Length about 10 inches ; wing 4·2 and tail 4·3 inches. In the young the iris is dark brown instead of the white or yellowish-white of the adult.

Distribution : *In our area* :—We have only come across it at plains level and the foothills in the Terai and the Duars. Stevens says :—" Recorded " appears to ascend the hills to about 5,000′ " With the exception of the following record, neither Mr. G. E. Shaw nor myself have met with it at anything approaching this altitude. I have no hesitation in regarding this occurrence as merely accidental as it is extremely unlikely to be overlooked. Gopaldhara, 4,550′, a pair observed hereabouts."

Outside our area :—Stuart Baker gives the distribution as "Northern India from the U. P., Eastern Rajputana to Bengal, south to Orissa, across to about the latitude of Bombay." In his "*Nidification*" he adds that it has been recorded from Cachar and from Kamrup in Assam but never came across it himself in either district.

Habits etc :—The "Seven Sisters" have a preference for the neighbourhood of man being one of the commonest of birds in gardens in the plains, especially where there are shrubberies, as remarked in "*Birds of an Indian Garden*, Fletcher & Inglis :—" The "Seven Sisters" are especially fond of gardens, being found wherever cover in the shape of a shrubbery is provided. In such places an observer will soon come across a small party of rather bedraggled-looking dusty-brown birds rustling about in long hops amongst the dead leaves and keeping up a ceaseless gabble of conversation as they follow one another about, turning over the fallen leaves and twigs and peering and prying beneath them for insects, snails and worms. Whilst busy among the leaves they always seem to have an air of dread of finding something terrifying concealed under them and are constantly leaping into the air and starting backward, and yet all the time seem to be in the height of spirits."

They are very noisy birds, murmuring to themselves as they hop about and then will burst into hysterical calls when anything out of the common happens ; when thus excited and vociferous they flirt their wings and jerk their tails up. They are most assiduous in their search for food and often if any choice morsel is turned up it forms the

cause of much brotherly or sisterly altercation, the most vituperative abuse being hurled at each other, and often leading to blows. This is presumably why they are called "sisters" or, by Indians, "brothers" and also on account of their behaviour in joining together to attack any intruder or to rescue one of the family from a hawk, cat or whatever it may be that has attacked it. Finn records an instance of one that " was caught by hand as it clung to the back of its relative's murderer." Although called "Seven Sisters" and "*Sath Bhai*" they are by no means always seven, their parties may vary from half a dozen up to twenty but they very often are seven. Whistler says " "Sath" is only a reflection of the phrase "panch sath" (5 or 7), an approximate phrase like ' half a dozen".''

Finn remarks about their sociability "That sociability is a passion with the species no one who has studied it can doubt ; I have kept several, and have found that they almost invariably exhibited the spirit of the poet's goldfinch, who

> "*A prison with a friend preferred*
> *To liberty without.*"

"If one found himself outside the cage which contained the happy family, he "did his possible" to get in again without any thought of escape. It may be ungenerously suggested that such birds are afraid to go about alone, lest their ribald remarks made in the security of numbers, meet with a just retaliation at the beaks and claws of outraged bird society ; and so it may be, but nevertheless there is a well-spring of sincere sociability under the Babbler's frowsy feathering. On the comparatively rare occasions when my captives were still, they employed themselves in in affectionately tickling each other's heads as they cuddled together, and I have even seen one diligently employed in endeavouring to clean the wing of a friend, soiled by the bird lime with which its capture had been affected. At the same time it must be admitted that the addition to their ordinary diet of table scraps or such a delicacy as a cockroach was apt to produce a sad description of fraternal harmony. On such occasions one might see one brother

prone in the sand, while another, holding his head "in chancery" with one foot, was punching the same with his beak in a manner calculated to awake grave fears for the integrity of the sufferer's skull when the punishment should be over; and once I saw two birds adherent with bill and claw to one and the same cockroach, which a third was devouring, as neither of the joint owners dared to let go his hold!"

They are very active birds on the ground or in a tree. When disturbed they fly up into a tree and will run along the branches, sometimes hopping over one of the party who may be in the way or will cling on to the trunks and move up one which is nearly vertical, by means of their powerful feet. Their flight is very weak and is never prolonged for any very great distance. As mentioned by Fletcher and ourselves "a certain degree of momentum is attained by a violent beating of the wings for a short distance, after which the flight becomes a gliding skim, their pace flagging and their line of flight sinking rapidly. Should a fairly wide open expanse need to be crossed, this can only be done by climbing a tree on one side high enough to allow for the rapid descent that attends their flight." When one flies off, they, one after another, follow him in a regular follow my leader sort of way.

Their food is varied and mostly obtained on the ground though they do get a certain amount of it, insects, on trees as well. It consists largely of insects and the late Mr. Mason, who examined the stomachs of thirty-six birds at Pusa summarised the contents as follews:—of 456 insects taken by 36 birds, 0 are beneficial, 185 injurious, and 271 neutral. Twenty-four birds took injurious insects and 22 neutral. Twelve took insects only, 4 took frogs and 1 worms. Vegetable matter forms a considerable portion of the diet, and this consists very largely of wild fruits. 23 birds took vegetable matter, and of these 10 took Ficus fruit, 2 "ber", and 2 took paddy grains.....Fruits, namely, ber (*Zizyphus jujuba*) and Ficus of several species are eaten to some extent, but I believe are always picked off the ground. I have been told that at times this bird feeds extensively on fruit buds, and

does some considerable damage, but have at present not been able to verify this. I have not examined any nestlings of this species, but from observations made in the field they appear to be fed principally on caterpillars. I have on several occasions seen geometrid larvæ fed to the young—with a certain proportion of beetles, and an occasional cricket or small grasshopper." These birds use their feet to hold anything large which they may be feeding on.

From an economical point of view the "Seven Sisters" may be considered beneficial.

These birds breed practically all the year round the only, unrecorded, months for eggs being October, December and January. They mostly breed just before or after the break of the South-West Monsoon. We sent to Stuart Baker notes on all we knew of the nesting of this familiar bird and cannot do better than quote what he writes in his *Nidification of Birds of the Indian Empire Vol. I pp. 152 & 153* :—"They are not forest birds, but with that exception may place their nests anywhere in gardens, orchards, hedges in cultivation, bushes in waste ground or in solitary trees or cacti in either cultivation or waste. The nest is a very rough untidy affair, cup-shaped and built of all sorts of material, such as grass, roots, leaves, straw, an odd cast skin of snake, a scrap or two of string or cotton and, rarely, a strip of rag. The principal ingredient is roots, Inglis says chiefly the aerial roots of fig-trees, and next in demand come grass and dead leaves. The lining is nearly always of roots or grass-bents but is often very scanty. Hume, however, found that the birds sometimes used hair with which to line their nests. Two nests recorded by him as taken in the Dun were made entirely of "fine woody tendrils" and lined with fine roots. Inglis, who has probably seen more of this bird's nests than any other collector, thinks the favourite sites for them are in trees, generally small ones, about 20 feet from the ground, but they have been taken from 30 feet or more up in big mango-trees in orchards and on the other hand, not 2 feet from the ground in thick bushes. Once I have seen a nest placed in thatching-grass growing in a matted tangle with small bushes."

Four eggs is the usual clutch but we have taken many of five and six and once seven. The eggs are a beautiful deep blue, some paler or deeper in colour than others ; they are highly glossy and measure about 1·01 × 0·78 inches.

This bird is extensively parasatised by the Common Hawk-Cuckoo or Brain-fever Bird (*Hierococcyx varius*) and the Indian Pied Crested Cuckoo (*Clamator jacobinus jacobinus*). The eggs of the birds which cuckold them resemble very closely those of the Babblers. Stuart Baker writing on the Brain-fever bird says :—"Almost exactly match those of *Turdoides* in colour as in shape, but average bigger, are of much stouter texture and much heavier..... As noted above, the eggs are the same deep blue as those of *Turdoides*, equally smooth but a trifle less glossed and much more easily stained ! these stains being often the first thing to attract one's attention to the fact that a Cuckoo's egg is present. The eggs of the Indian Pied Crested Cuckoo are also less glossy than those of the Babblers.

For the benefit of those who may find Cuckoos eggs in the nests of these birds I quote what Stuart Baker writes under the Indian Pied Crested Cuckoo. "It is of course impossible very often to distinguish between the eggs of this Cuckoo and those of *Hierococcyx varius*, but over most of its range the latter breeds in April, May and June and the former in June, July and August. The eggs of the Hawk-Cuckoo are also larger on the average and are more broad elliptical rather than spherical. The yolk of the eggs of *Hierococcyx* is much paler than that of the eggs of *Clamator*." We have found as many as six Pied Crested Cuckoos eggs along with three of the Babblers eggs in one nest.

With regard to the "Seven Sisters" as an edible quantity, Finn who was very fond of experimenting in the culinary attractiveness, or otherwise, of various birds wrote "A very plump one I experimentally ate tasted much like a quail, and herein perhaps lies an economic possibility for the "Seven Sisters;" the clan would just about fill a pie."

Mackintosh gave the following folk-lore story "There is a story current amongst Indians that, a King "once upon a time," called them in and solicited their services to dig a well, when the job was finished, after resting a while, they made off to the King, and demanded payment for their labour which had been agreed upon ; but lo an behold some wily on-looker had hastened to the palace, and drawn the sum of money, set aside for them. The King, we learn, would not entertain their demands, and positively refused to pay over again. This is why the noisy and animated altcreation goes on as soon as they, or their heirs, administrators and assigns, remember the vile trick which was played upon them."

A Description of the Tsine and its Habitat and Shikar.

By

Col. H. S. WOOD I.M.S. *(Retired).*

This splendid animal is known as the Burmese Wild Bull (*Bos banting birmanicus*, Lyddeker formerly *Bos Sondaicus*, M. and S) of naturalists. In Java and Sumatra it is called the Banting. The Burmese call it *Tsoing* or *Tsine* and the Manipuris *Lumsun Angangba* or the Red Wild Bull.

Looking at the pure domestic Burmese cattle, one is, at once, struck with the general resemblance to the Tsine both in colouring and shape, though, of course. the Tsine is much bigger. It is a question whether the Tsine is the domestic beast that has run wild, or whether the domestic cattle are descendants of the wild species. I am inclined to believe in the latter theory. The original Burmese domestic cattle have been crossed with other breeds, so that to see the original Burmese cattle that most resemble the wild animal one has to visit the remote villages in the Kubbo-Kale Valley, Ruby Mines and other parts of Burmah.

My experience has only been limited to the Burmese Tsine and it would be interesting to know whether the animals found in Java and Sumatra are the same in colouring etc., as the Burmese animal.

The Tsine is a most beautiful animal and to watch a herd of these animals grazing in a forest glade with the sun shining on their chestnut satin-like skins is a sight that will never be forgotten. A crack of a twig or the scrunch of a dry leaf sends the whole herd scampering off, with a *pshew* and a snort, at a terrific pace, their tails held straight out. They will now go for miles without stopping. The Tsine is much handsomer than the Bison and is much dreaded by the Burmese. The Hill Tribes trap it in pitfalls and shoot it with arrows poisoned with aconite. The Burman, who risks nothing, scares the animal by sitting up in a tree near a salt-lick, which the animals, like Bison, periodically visit.

A wounded Tsine will charge viciously, and the only way to escape it is to jump to one side or to lie flat on the ground, if unarmed. It strikes with its feet as well as with its horns and can inflict serious wounds as the tips of the horns are very sharp and curve backwards. The Burmese told me that if it kills a man it will lick the flesh off some of the bones with its rough tongue, perhaps the salt taste of the flesh makes it do so. The same habit is attributed to the Wild Yak and the Bison. I have personally never known of a case, but there must be some truth in it if people as widely separated as the Tibetans, Assamese and Burmese tell the same story,

The Tsine, twenty years ago, was found by me in great numbers in the huge forests and grass lands lying between Manipur and Burmah, in fact the upper part of the Kubbo-Kale Valley and base of the Chin Hills ; a tract of country into which I made several hunting trips. What a sportsman's paradise it was !! In a ten days' trip N. and I bagged Elephant, Bison, Tsine, Buffalo, Sambhur, Hog Deer and Partridge and every sort of game. Alas ! like many other parts of India which should have been made into sanctuaries years ago, or preserved, this lovely spot is now almost devoid of game. The exploitation of the forests by timber companies and the indiscriminate issue of arms have been its ruin.

Before leaving India I was anxious to revisit my old haunts, but the Magistrate wrote to me that it was not worth

while. What a slur on our methods of game preservation ; This, however, is a digression !

The Tsine is only confined to Burmah, and is not found in India proper. Even in Burmah it is only found in certain parts, The Ruby Mines, Shan States, Hukong Valley the Yomahs and Mogoung. As far as I know it is not found in Lower Burmah. It is also found at the base of the Chin Hills. It may, perhaps, be found in other parts of Burmah and, if so, some of my readers may be able to correct me.

In my various hunting trips I have only been able to bag three of these animals—one a magnificent bull, mentioned in Rowland Ward's book "Records of Big Game" as a record for owner's measurements. The trophy has been beaten in size by one obtained in the Straits Settlements. Mine is now in the Bristol Museum together with my other trophies.

Tsine are very shy and their senses ot sight, smell and hearing so acute that their shikar is difficult and entails hardship and "Swank", perhaps, sleeping out in the forests for days in an improvised shelter and on short rations. The greatest Tsine hunter I know of was B. Forest Officer at Kendat. He never wore boots when stalking these animals. He would disappear into the forests for days after a solitary bull, accompanied by two men and his faithful bull terrier. He had a wonderful collection of Tsine heads which unfortunately were all destroyed when his bungalow caught fire.

These animals are found in herds, varying from ten to thirty in number, and in the larger herds, there are generally found two or three small bulls, whose heads are not worth obtaining. The largest horns, as in other bovine animals, are found in solitary bulls, who keep to themselves and only occasionally mix with the cows during the breeding season. When the green grass sprouts up, after the annual fires, the old bulls wander over large areas and seldom remain in the same locality for two successive days ; while, like the Bison, they are almost always on the move, feeding as they go along and only lying down during the day when the sun is at its hottest and the horse flies persistent.

The Tsine can go for days without water and the Burmese have told me that they usually drink once in seven days; perhaps the young bamboo shoots and luscious grass supplies the necessary fluid. I have come across herds in absolutely dry districts miles away from water.

Another peculiarity of the Tsine is that it does not mind the bites of the horse fly, with which the teak forests are infested at the beginning of the monsoon. When other animals have fled to the higher and cooler ranges or immersed themselved in water to escape this pest, the Tsine will never resort to water, but prefers to lie down in the forest surrounded by these buzzing tormentors. No doubt the long and bushy tuft at the end of its tail is an efficient fly wisp in driving off these blood suckers.

My first introduction to Tsine was when I came on a herd sitting in a hollow in the ground and all I could see was a sea of tails, waving vigorously in the air. All of them were asleep with the exception of a cow who was doing sentry.

During the rains, when the country gets flooded and swampy, the Tsine betake themselves to the foot-hills, but never go very high up. At this time they get their fill of bamboo shoots, of which they are passionately fond. After the yearly fires they descend into the valley and wander through the vast teak forests and kine grass.

Unlike the Bison and the Buffalo, they never come down to the rice fields of the villagers, being much too shy. The cow calves during the rains; the colour of the calf is light red, and only one is produced at birth. They travel great distances to visit salt-licks, many of these are nothing but mud and water impregnated with saline matter, probably sodium sulphate. Many salt-licks have a sulphurous odour and these are resorted to by Elephants etc. also by birds, Parrots, Green and Imperial Pigeon.

Bison and Tsine are never met together in a herd although I have found both beasts within the radius of a mile of each other. The spoor of the Tsine is deer-like and heart

shaped, pointed auteriorly and quite unlike that of the Bison. The horn of the hoof is soft and the underside of it is never worn or chipped, as the animal never ventures into stony or difficult ground like the Bison.

I have always found Tsine in good condition, in fact their skins shine like the groomed skin of a race horse with a satiny appearance. They are, however, subject to rinderpest. The skin is much prized by the Burmans for making sandals, but the part that is most prized in the bull is the skin of the genital organs. The skin of this part resembles that of the Crested Grebe, and is used as a tobacco pouch. It is always the tracker's prize.

One animal I shot had the whole of the belly covered with warts, not ticks, varying in size from a pea to a hazel nut. The neck of an old bull is generally covered with scars, the result of wounds received in combat, or from the bites of ticks. The Tsine is singularly free from the latter, but I have found the genital organs of a bull covered with huge grey ones. In the paunch or rumen of the Tsine, mixed up with the grass I have seen hundreds of a peculiar pitcher-like parasite, the pallisade worm, and they are often in such numbers that the stomach seems to be lined with them. The parasite is pitcher or bladder shaped and a quarter of an inch in length. They are of two kinds, one red and the other white. They adhere to the wall of the stomach and feed on the blood or serum like a leech, and each has a sucker like a leech. They die very soon after exposure to the air. I have seen the parasite in the stomachs of other animals; Sambhur, ox, but notably in the Tsine and Eld's deer *(Cervus eldi)*. The parasites do not seem to affect the animals health, as the beasts were always well conditioned, sleek and fat. Human beings are sometimes infested by this parasite but I have never seen a case.

Description and details of bull Tsine.

The general colour of this bull, a very old one, was of a light red, fading and becoming lighter as the flanks and under surface of the body were approached, here the colour

was almost greyish, intermixed here and there with white ; the inside of the thighs was of a yellowish-grey where the skin was almost devoid of hair and here also an unctious brown secretion resembling the wax of the ear was present. The inside of the forelegs and under parts of the chest were of a greyish-white, and the anterior portion of the foreleg from the knee upwards of a reddish-black colour ; this tint is also slightly marked on the hind legs. There was just a vestige of a dewlap, over this there has been some discussion, but Colonel Pollock, the great hunter, agrees with me as to its presence. This dewlap was about three inches at its greatest width. Undersurface of the chest a lightish yellow colour intermixed with grey. The hair of the skin was short and glossy on the redder parts, but coarse and thick on the grey parts. On the belly the skin was half an inch thick and nearly an inch thick on the neck. The surface of the body was pitted and scarred here and there from bites of insects and wounds received in combat. There were four rudimentary mammae, half an inch in length, situated in front of the genital organs, two on each side of the mesial line and of a saffron colour. The scrotum was covered with a very fine silky greyish-white hair and felt like velvet. The upper parts of the head, anteriorly and at the sides, was of a tawny white, the under parts were much lighter, being almost grey ; the muzzle greyish-black, and the neck reddish-brown. The lips were greyish white covered with black bristles, and the lower lip had a fringe of long grey hairs projecting from its under surface. The tail had a large reddish-brown tuft. The ears appear comparatively small when compared with those of the cow, their upper parts were reddish-brown, posteriorly greyish-white, tips and anterior margins jet black and greyish-white hairs of considerable length project inwards from the anterior border. The interior of the auricle is of a saffron colour. The left ear was split in four places, the longest being six inches. The colour round the eyes was greyish-white with black eyelashes. The fleshy parts of the nose were black. Eyes irides brown, cornea bluish-white. The incisors of the lower jaw were loose and considerably worn down, showing

that the beast was old, probably about twenty years old. There was a most curious condition of the upper part of the head, over the frontal region where, instead of a skin covered with hair, there was bare thickened skin devoid of hair and of a greyish-black colour. Its general surface was smooth, but in patches very warty like the skin of a lesser Rhinoceros. This curious portion of skin extended, like a chaplet, over the head; the area it occupied would be represented, in the dry skull, by lines drawn between the upper parts of the orbit and between the bases of the horns at top of the skull. This cuticle formed a distinct projection or crest; this cover was soft on pressure and slightly moveable. In other bulls this thickened skin throws out horny matter and in time a bony carapace forms with convexity forwards and joined to the horns at its ends, giving a most curious appearance to the head. This skin and horny carapace forms a most excellent cushion for breaking the shock of any concussion on the brain when the bulls fight. The reason for their being present on the Tsine is this:— The bones of the skull when compared with that of the Buffalo or Bison are much thinner and less massive, so something has to be provided for the protection of the brain. This skin, on dissection, was found to be more than two inches thick and very adherent to the bone. In the bull there is a dorsal ridge which ends abruptly about the middle of the back but there is no hump. Colonel Pollock says that he has noted white circles round the eyes of bulls he has shot in the Yomahs, he also remarks that he has seen the colour deep red and coffee colour. I once saw a bull whose colour was a uniform iron-grey. He was a magnificent animal, but I did not get him. It was late in the evening. I just got a glimpse of him for a moment, when he went off with a snort.

MEASUREMENTS OF BULL.

Height at shoulder	...	15 hands.
Length, (nose to tip of tail over back)		14 feet.
Length, (nose to tip of tail across back)		11 feet 9 inches.
Length, head and neck above	...	3 feet 10 inches.
Length, head and neck below	...	3 feet.

Length of tail	...	2 feet 11 inches.
Length of ears	...	10 inches.
Girth, round middle of body	...	7 feet 10 inches.
Girth, chest	...	7 feet.
Girth, foreleg above knee	...	15 inches.
Girth, hindleg above hock	...	1 foot 6 inches.
Girth of neck, middle	...	3 feet 10 inches.
Girth of haunch	...	1 foot 11 inches.

SKULL AND HORNS.

Length of skull anteriorly	...	1 foot 11½ inches.
Distance between orbits	...	1 foot 2 inches.
Breadth of forehead, between horns	...	10 inches.
Length, left horn	...	33½ inches.
Length, right horn	...	31 inches.
Girth, right horn at base	...	16 inches.
Girth, left horn at base	...	17 inches.
Distance between tips	...	26⅞ inches.
Distance between convexities	...	38½ inches.

HEAD.

Girth round muzzle	...	2 feet 1 inch.
Length, eye slit	...	3 inches.
Length of naves	...	2¾ inches.
Girth of head above eyes	...	2 feet 4½ inches.

FEET AND LEGS.

Length, foreleg, hoof to knee	...	1 foot 5 inches.
Length, hindleg hoof to hock	...	1 foot 10 inches.
Length of hoof, forefoot, under surface		6 inches.
Length of hoof, hindfoot	...	5 inches.
Breadth of hoof, forefoot	...	4 inches.
Breadth of hoof, hindfoot	...	4 inches.

The transverse section of a horn represents more an oval than a cylinder. The general colour of the horns is of a semi-transparent green, except the tips, which are jet black for about six inches; the bases, which are very rough, irregular, gnarled, ringed and rugged, are black in colour. The horns gradually taper to a very sharp point their direction being:—1. Backwards and outwards. 2. Forwards and upwards. 3. Backwards, the tips looking almost directly back.

(To be continued.)

The Lesser Black Krait.

Bungarus lividus.

No. 63 in Shaw and Shebbeare's "Snakes of North Bengal and Sikkim."

This Snake should be of particular interest to members of this Society as it appears to be found only in Northern Bengal and Assam. It is probably commoner in the Duars than anywhere else. Col. Wall examined 12, of which 5 were from the Jalpaiguri district and I have had 9 in the past 5 years from Mal and Dalgaon districts.

The Banded Krait (*Bungarus fasciatus*), owing to its distinctive colour, is familiar to almost everyone and easily identified at sight, as there is no other snake that resembles it at all closely. The Black Kraits are, however, insignificant looking reptiles and though the Lesser Black Krait is as common in the Dooars as the Banded one it generally escapes notice.

This Snake varies a good deal in colour from dead shiny black to quite light grey, the black ones appear dark brown after they have been in spirit some time but in life they look black. The grey ones have a sheen very like graphite. The colour is even and of one shade the whole length of the snake, the head being black or grey like the body. The belly is lighter, being dirty white or pale yellowish, with the front part of each ventral scale mottled with grey; this mottling is very variable and in some specimens very faint while in others the greater part of each ventrel is grey.

The body is round, not triangular like the Banded Krait, the head is not distinct from the neck and the tail tapers to a point. The maximum recorded length is 3'9" but it is usually about 2'6".

In Boulenger's "Fauna of British India" this Snake was mixed up with *Bungarus niger*, the Greater Black Krait but

Col. Wall separated the two species giving the following characteristics for each.

	B. lividus.	*B. niger.*
Scales ...	15-15-15	15-15-15
Ventrals ...	209 to 217	216 to 231
Subcaudals ...	36 to 42, all entire	47 to 57, all entire.
Vertebral scale	Longer than broad in midbody.	Broader than long in midbody.

It will be seen that the only differences are in the number of subcaudals and the vertebral scale and there is some doubt as to whether they are two separate species. I have found two specimens with more than 217 ventrals one having 218 and the other 221 but the number of subcaudals was in each case under 42.

With regard to the habits of this Snake it is possible to say very little. Wall says nothing of them and I have only seen three or four alive and have never been able to keep one in captivity, but can say, from experience, that they are not agressive and are slow movers. Of 9 that I have collected none were found near bungalows or even near coolie lines and they appear to frequent the tea and bamboo *baris*.

One, which had obviously just had a meal, was opened up and found to contain three young Shrews,

Any Snake killed in the Dooars or Darjeeling districts having the scales under the tail *whole* will be a Krait and only the Greater and the Lesser Black Kraits are of one, even colour, all the other members of the genus being more or less banded with white or yellow ; so a Black Krait is not difficult to pick out and if the subcaudals count 42 or under it is *B. lividus* and if 47 or over it is *B. niger*. If some one could find one with a count between these two numbers it would be very interesting to examine.

The only recorded case of a person bitten by this Snake, that I know of, is given by Wall in his "Poisonous Terrestrial Snakes of our British Indian Dominions" and the patient died in about 15 hours.

November, 1935. P. E. BARKER.

Notes on a collection of Dragonflies from Bhutan.

(Order—*Odonata.*)

BY

F. C. FRASER. LT. COL., I.M.S, (Retd)., F.R.E.S.

This small collection of dragonflies, which has been sent to me for identification by Mr. Chas. M. Inglis, comes from Paro, 7000″, Bhutan and numbers only ten specimens distributed in four species.

Since these are the only Odonates so far recorded from that country, it is unfortunate that a greater advantage was not taken of this opportunity of widening our knowledge of the fauna. None of the species are new to science but all are restricted to that part of the Indian Empire and at least one species is extremely rare.

Systematic.

SUBORDER—ZYGOPTERA.

1. *Ceylonolestes cyanea* (Selys).—A single pair only, the male rather teneral and exhibiting no blue ground colour. They do not differ in any way from type. The species extends widely and commonly throughout the N. E. Himalayas and is especially common in N. Bengal and Sikkim.

2. *Orthetrum sabina* (Drury).—One female of rather large stature. A common insect distributed throughout the whole of S. Asia and eastwards into the Pacific.

3. *Sympetrum hypomelas* (Selys).—Two males and one female, all true to type. This species is restricted to N. Bengal, Assam, Sikkim, Thibet, N. Burma and now Bhutan. It may be distinguished by the extraordinary crochet-shape of its hamules of the anterior genitalia. The type comes from Shillong, Assam, from whence I have received a series.

4. *Allogaster latifrons* (Selys.)—Three males and one female of this rare insect are represented in the collection. None differ form type save in minor details

and in the venation, The dorsal apical yellow markings on abdomen are slightly divided by the dark middorsal ridge. The nodal index shows wide variations to that given by me in the Monograph on the Fissilaboidea, there being 15-18 antenodals, and 13-17 postnodals in the forewings, 10-13 antenodals and 13-17 postnodals in the hindwings; the anal-loop varies from 4-7 cells in the males (My figure of 15 given in the Monograph is an error for 5); the anal triangle ls 4-5 celled.

Including these four specimens, only nine are known which are distributed as follows:—Selysian collection, Brussels Museum, female, which is the type; British Museum 1 male, 1 female; Fraser collection 1 female; Darjeeling Museum 3 males and 2 females.

A Second Note on the Heterocera of Darjeeling.

The present note is based on material collected between the 10th May and 9th June 1935. The weather during this period was much wetter than normal and, therefore, not over favourable for collecting.

I found the Rungeet Lebong Road a productive collecting ground, beating the bushes along its sides disturbing good numbers of *Geometridæ*, and I think that the electric lights along it would repay working at night.

I wish to emphasis the incompleteness of the following list. A species of *Nolinæ* was very common at light but I kept on delaying the taking of a series and I left Darjeeling without having identified the species. The same applies to several of the smaller and less conspicuous *Geometridæ*.

I have followed the same system as regards nomenclature and made use, with the addition of remarks on the rarity, of the same terms as I employed in my previous note. Species marked with an asterisk were not caught in 1934.

Saturniidae.

8* *Antheraea roylei*, Moore. At rest. A single female on the Chowrasta.

Eupterotidae.

53* *Palirisa cervina*, Moore. At light. Not common.

Sphingidae.

96* *Rhodoprasina (Cypa) floralis*, Btlr. At rest. A single female of this very rare species was caught by an ayah on one of the paths behind the Hotel Mount Everest.

177* *Rhopalopsyche nycteris*, Koll. Flying. Very common.

Notodontidae.

230* *Pydna testacea*, Wlk. At rest. Common.

254* *Pseudofentonia (Fentonia) argentifera*, Moore. At light. Common.

305* *Megaceramis lamprolepsis*, Hmpn. At light. A single male.

Cymatophoridae.

324* *Habrosyne derasa*, L., *indica*, Moore. At light. One female.

327* *Habrosyne argenteipuncta*, Hmpn. At light. One male.

329* *Thyatira batis*, L. Bred. Larvae common on *Rubus*.

330* *Gaurena florens*, Wlk. At light. Very common.

Syntomidae.

446* *Eressa (Syntomis) multiguttata*, Wlk. Flying. Common.

Hepialidae.

683* *Phassus damor*, Moore. At rest. A single male. The tuft of hair on the hind legs has a strong, spicey scent.

Drepanidae.

697* *Cyclidia (Euchera) rectificata*, Wlk. At light. Not uncommon.

704 *Teldenia vestigiata*, Btlr. At light. One female.

707* *Leucodrepana obliquilinea*, Hmpn. At light. One female.

... *Leucodrepana fulvicosta*, Dudg. At light. Not uncommon.

753* *Oreta obtusa*, Wlk. At light. Two males.

Thyrididae.

782* *Rhodoneura emblicalis*, Moore, *sphoraria*, Swinh. At light. One male.

... * *Rhodoneura taeniata*, Warr. At light. Common.

Limacodidae.

879* *Ceratonema retractatum*, Wlk. At light. One female.

Lasiocampidae.

923* *Syrastrena minor*, Moore. At light. One male.

936* *Trabala vishnu*, Lef. At rest and at light. Common.

949* *Metanastria (Odonestis) lineata*, Moore. At light. One female.

Lymantriidae.

958* *Varmina indica*, Wlk. Bred. Larvae not uncommon.

988* *Pantana bicolor*, Wlk. Flying and at rest. Common.

1009* *Dasychira flavimacula*, Moore. At light. One male.

1011 *Dasychira bhana*, Moore. At light. Very common.

1018* *Mardara caligramma*, Wlk. At light. Not common.

1021* *Numenes patrana*, Moore. At rest and at light. Not common.

1048* *Gazalina apsara*, Moore, *venosata*, Wlk. At rest and at light. Common.

1049 *Gazalina chrysolopha*, Koll. At rest. One male.

1055 *Euproctis divisa*, Wlk. At rest and at light. Common.

1063* *Euproctis inconcisa*, Wlk. At light. Common.

1101* *Porthesia (Euproctis) scintillans*, Wlk., *limbata*, Btlr. At light. One male.

1120* *Caragola (Caviria) sericea*, Moore. At light. One female.

1126* *Cispia venosa*, Wlk. At light. One female.

Arctiidae.

1140* *Asota (Hypsa) plana*, Wlk., *lacteata*, Btlr. (*complana*, Hmpn. part nec Wlk.) At light. One female.

1176* *Diacrisia* (*Spilosoma*) *rubilinea*, Moore. At light. One male.

1179 *Diacrisia* (*Spilosoma*) *casigneta*, Koll. At light. Very common.

1188* *Diacrisia* (*Thyrgorina*) *multivittata*, Moore. At light Common.

1213* *Diacrisia* (*Alphæa*) *fulvehirta*, Wlk. At light. One male.

1215* *Estigmene* (*Alphæa*) *imbuta*, Wlk., *sikkimensis*, Roths. At light. Not uncommon.

1261* *Deilemera arctata*, Wlk. At light. One female.

1266* *Nyctemera plagifera*, Wlk. At light. One male.

1268* *Nyctemera varians*, Wlk. At light. One female.

1281a* *Chionæma* (*Cyana*) *alborosea*, Wlk. At light. One male.

1289* *Chionæma* (*Cyana*) *adita*, Moore (*signa*, Hmpn. part nec Wlk.) At light. Common.

1303 *Kerala punctilineata*, Moore. At light. Common.

1313* *Agylla* (*Sidyma*) *beema*, Moore. At light. One female.

1315* *Agylla* (*Sidyma*) *ramelana*, Moore. At light. Not uncommon.

1321* *Agylla* (*Gnophria*) *rufifrons*, Moore. At light. One female.

1327 *Chrysorabdia viridata*, Wlk. At light and at rest. Common.

1382* *Lithosia* (*Simaræa*) *basinota*, Moore. At light. Common.

1402* *Eugoa bipunctata*, Wlk. At light. One female.

1426* *Asura* (*Miltochrista*) *undulosa*, Wlk. At light. Very common.

1459* *Asura* (*M.*) *humilis*, Wlk. At light. One male.

1468* *Miltochrista cuneonotata*. Wlk. At light. Not uncommon.

1473* *Miltochrista gratiosa*, Deless. At light. One female.

1503* *Tyana callichlora*, Wlk. At light. One female.

1505* *Tyana chloroleuca*, Wlk. At light. One female.
1506 *Tyana falcata*, Wlk. At light. Not uncommon.
1511* *Earias uninotata*, Wlk. At light. One female.
1530 *Celama (Nola) fasciata*, Wlk. (*nigrifascia*, Hmpn.) At light. One female.
* *Nola loxoscia*, Hmpn. At light. One female.
1535* *Nola (Rhynchopalpus) argentalis*, Moore, At light. One femal.

Agaristidae.

1556* *Exsula (Eusemia) victrix*, Westw. Flying. Common but flies high and is difficult to catch.
1570 *Scudyra (Zalissa) bala*, Moore. At light. One male.
1576* *Pimprana (Zalissa) atkinsoni*, Moore. At rest. One female.

Noctuidae.

1601 *Chloridea (Heliothis) obsoleta*, F. (*armigera* Hbn.) At light. Non uncommon.
1620* *Euxoa (Agrotis) segetum*, Schiff. At light. Common.
1622* *Euxoa (A.) spinifera*, Hbn. At light. Common.
1629* *Rhyacia (Agrotis) sikkima*, Moore. At light. Not uncommon.
1635* *Rhyacia (A.) flavirena*, Moore (*descripta*, Hmpn, part nec. Brem.) At light. Common.
1635 *Rhyacia (A.) basistriga*, Moore (*descripta*, Hmpn. part nec. Brem.) At light. Common.
1640 *Axylia* (*Agrotis*) *putris*, L. At light. Common.
1647 *Rhyacia (A.) c-nigrum*, L. At light. Common.
1657* *Rhyacia (A.) triangularis*, Moore. At light. Not uncommon.
1662* *Triphaena* (*Epilecta*) *semiherbida*, Wlk. At light. Common.
1671* *Hermonassa consignata*, Wlk. At light. Common.
1675* *Hermonassa lanceola*, Moore. At light. Uncommon.
1676* *Hermonassa sinuata*, Moore. At light. One female.
1679* *Polia* (*Hadena*) *consanguis*, Guen. At light. Very common.
1686 *Scotogramma* (*Hadena*) *submarginalis*, Wlk. (*incisa*, Moore). At light. Common.

1687* *Scotogramma (H.) simillima*, Moore. At light. Uncommon.

1732* *Trachea (Euplexia) melanospila*, Koll. At light,. Common.

1733* *Euplexia aurigera*, Wlk., *incolorata*, Warr. At light. One male.

1735 *Euplexia auroviridis*, Moore. At light. One male.

1738* *Euplexia aurantiaca*, Hmpn. At light. One male.

* *Acronicta indica*, Moore (*rumicis*, Hmpn. nec L.) At light. One female.

1829* *Prodenia litura*, F. (*littoralis*, Bsd.) At light. Not common.

1831* *Spodoptera mauritia*, Bsd. At light. Not uncommon.

1833 *Amyna punctum*, F. (*selenampha*, Guen.) At light. Common.

1875* *Leucocosmia (Caradrina) nonagrica*, Wlk. (*reclusa*, Hmpn. part nec Wlk.) At light. Common.

1877* *Dadica (Caradrina) lineosa*, Moore. At light. Common.

1894 *Sideridis (Leucania) rufistrigosa*, Moore. At light. Common.

1895* *Hyphilare (Leucania) 1-album*, L. At light. Common.

1904* *Sideridis (L.) sinuosa*, Moore, At light. Common.

1913 *Sideridis (L.) unipuncta*, Haw. At light. Common.

1914* *Sideridis (L.) albicosta*, Moore (*pallidicosta*, Hmpn.) At light. One male.

1928* *Hyphilare (L.) albiavenata*, Swinh. (*albicosta*, Hmpn. nec Moore.) At light. Not uncommon.

1941* *Auchnis intermedia*, Brem. At light. Not uncommon.

1963 *Canna (Diphthera) pulchripicta*, Wlk. At light. Uncommon.

1965 *Canna (D.) prasinaria*, Wlk. At light. Very common.

2135* *Zurobata vacillans*, Wlk. (*irrecta*, Wlk.) At light. One female.

2177* *Westermannia superba*, Hbn. At light. Not uncommon.

2231* *Argyrothripa robusta*, Moore. At light. One female.

2237* *Nanaguna* (*Clettharra*) *breviuscula*, Wlk. (*valida*, Wlk.) At light. Not uncommon.

2265* *Eutelia jocosatrix*, Guen. At light. One male.

2272* *Eutelia dulcilinea*, Wlk. At light. One male.

2282 *Odontodes aleuca*, Guen. At light. Common and very variable.

2288* *Stictoptera illucida*, Wlk. At light. Very common and very varied.

2289* *Stictoptera albodentata*, Moore. At light. Common.

2291* *Stictoptera costata*, Moore. At light. One male.

2300* *Cosmophila mesogona*, Wlk. At light. Uncommon.

2307* *Cosmophila erosa*, Hbn. At light. Common.

2318* *Churia arcuata*, Wlk. At light. Very common and variable.

2371* *Erygia apicalis*, Guen. At light. One male.

2389* *Hypocala subsatura*, Guen. At light. Very common. I got only one example of v. *limbata*, Btlr.

2429* *Polydesma inangulata*, Guen. At light. Fairly common.

2443 *Homoptera umbrina*, Guen. At light. Common, both type and f. *albicincta*, Guen.

2483* *Ophiusa melicerte*, Drury. At light. One male.

2485* *Ophiusa illibata*, F. At light. One male.

2505* *Ophiusa algira*, L. At light. One female.

2520* *Ophiusa triphaenoides*, Wlk. At light. One female.

2549* *Plecoptera reflexa*, Guen. At light. One male.

2573* *Cauninda* (*Remigia*) *undata*, F. (*archesia*, Cr.) At light. Not uncommon

2591* *Entomogramma tortum*, Guen. At light. One female.

2619* *Oxyodes scrobiculata*, F. At light. Uncommon.

2650 *Calpe emarginata*, F. At light. One male.

2657* *Arsacia saturatalis*, Wlk. At light. One male.

2662* *Phytometra* (*Plusia*) *nigriluna*, Wlk. At light. One female.

2664* *Phytometra (P.) nigrisigna*, Wlk. At light. Not uncommon.

2674* *Phytometra (P.) ornatissima*, Wlk. At light. One male.

2678* *Phytometra (P.) orichalcea*, F. At light. Common.

2797* *Libisosa (Simplicia) robustalis*, Guen. At light. Common.

2811* *Bleptina hadenalis*, Moore. At light. Common.

2832* *Mastigophorus duplicifascia*, Hmpn. At light. One male.

2846* *Hydrillodes lentalis*, Guen. At light. Very common.

1850* *Hydrillodes truncata*, Moore. At light. Very common.

2853* *Hydrillodes abavalis*, Wlk. At light. Very common.

2856 *Nodaria innocens*, Btlr. At light. One male.

2857* *Nodaria erecta*, Moore. At light. One female.

2899* *Anoratha costalis*, Moore. At light. One male.

2908* *Dichromia triplicalis*, Wlk. Flying. One female, was very possibly passed over as *D. quadralis*, Wlk.

2909 *Dichromia quadralis*, Wlk. Flying, at rest and at light. Common.

2917* *Hypena longipennis*, Wlk. At light. One male.

2919* *Hypena proboscidalis*, L. At rest. Cummon.

2944* *Hypena obductalis*, Wlk. At light and at rest. Common.

2949 *Hypena lacessalis*, Wlk. At light. Common.

2952* *Hypena divisalis*, Moore. At rest. Common.

Epiplemidae.

3046* *Epiplema multistrigaria*, Moore. At light. One female.

3061* *Epiplema himala*, Btlr. At light. Uncommon.

Geometridae.

3079* *Urapteryx primularia*, Btlr. At light. One female.

3088 *Sirinopteryx rufivinctata*, Wlk. At light and at rest. Common.

3096 *Myrteta sericea*, Btlr. At light. One male.

3102* *Myrteta simpliciata*, Moore. At light. One female.

3108* *Bapta mytylata*, Guen. At light. Common.

3112* *Metrocampa haliaria*, Wlk. At light. One male.

3133 *Peratophyga aerata*, Moore. At light. Common.

3154* *Hypochrosis hyadaria*, Guen. At light. Not uncommon and very variable.

3156* *Hypochrosis festivaria*, F. At rest. One male.

3175 *Anonychia grisea*, Btlr. At rest. Common.

3177* *Heterolocha phaenicotaeniata*, Koll. At light. Uncommon.

3181* *Pseudopanthera (Venilia) himalayica*, Koll. At rest. Common.

3195* *Corymica specularia*, Moore. At rest. Uncommon.

3281* *Hyperythra phoenix*, Swinh. At light. Uncommon.

3289 *Psyra angulifera*, Wlk. At light. Common.

3290* *Psyra cuneata*, Wlk. At rest. Uncommon.

3319* *Garaeus specularis*, Moore. At light. Uncommon.

3366* *Gnophus muscosarius*, Wlk. At light. One female.

3367* *Gnophus aereus*, Btlr. At light. One female.

3385 *Ectropis (Boarmia) duplexa*, Moore. At light. One male.

3471* *Medasina parisnattei*, Wlk. At light. Not uncommon.

3516* *Abraxas sylvata*, Scop., *leopardina*, Koll. At rest. Common.

3590* *Ozola impedita*, Wlk. *(biangulifera*, Moore) At rest. One female.

3593* *Naxidia punctata*, Btlr. At rest. One male.

3594* *Naxidia irrorata*, Moore. At rest. Common.

3599* *Cryptoloba cinerea*, Btlr. At light and at rest. Common.

3605* *Syzeuxis trinotaria*, Moore. At rest. One female.

3611* *Anaitis pudicata*, Guen. At rest. Common.

3612* *Anaitis fulgurata*, Guen. At light. Uncommon.

3642* *Cidaria variegata*, Moore. At rest. Common.

3645* *Cidaria catenaria*, Moore. At rest. One male.

3647* *Cidaria aurata*, Moore. At light. Uncommon.

3653* *Cidaria mediovittaria*, Moore. At rest and at light. Common.

3654 *Euphyia (Cidaria) silaceata*, Schiff. At light and at rest. Not uncommon.

3656* *Cidaria niphonica*, Btlr. At light. One female.

3658* *Cidaria interplagata*, Guen. At rest. One female.

3665* *Cidaria aurigena*, Btlr. At light. One male.

3678* *Cidaria viridata*, Moore. At light and at rest. very common.

3685* *Larentia albigirata*, Koll. At light and at rest. Common.

3700 *Perizoma (Larentia) maculata*, Moore. At light. Very common.

3707* *Larentia variabilis*, Warr. At light. Uncommon.

3716* *Larentia hockingii*, Btlr. At light. One female.

3717* *Larentia lacernigera*, Btlr. At light. Common.

3718* *Larentia schistacea*, Moore. At light. Common.

3724* *Larentia truncata*, Hufn. At light. Common and variable.

3730* *Photoscotosia miniosata*, Wlk. At light. One female.

3739* *Photoscotosia aurantiaria*, Moore. At light and bred. Not uncommon.

3786* *Eupithecia fulvipennis*, Btlr. At rest. One female.

3805* *Brabira artemidora*, Oberth. At light. Uncommon.

3824* *Hydrelia bicolorata*, Moore. At light. Not common.

3825* *Hydrelia distorta*, Hmpn. At light. One male.

3826 *Hydrelia subobliquaria*, Moore. At rest. Common.

3830* *Hydrelia pictaria*, Moore. At light. One female.

3836* *Asthena plurilinearia*, Moore. At light. Common.

3842 *Cambogia pluristrigata*, Moore. At light. One female.

3851* *Hastina gemmifera*, Moore. At light. One female.

3857* *Craspedia mecysma*, Swinh. At light. Uncommon.

3865* *Scopula (Craspedia) ligatatria*, Wlk. (*nictata*, Guen.) At light. One male.

3879* *Scopula (C.) fibulata*, Guen., *effrenata*, Wlk. At light. Not uncommon.

3883* *Scopula (C.) remotata*, Guen. At light. Common.

3883 *Scopula (C.) undulataria*, Moore (*remotata*, Hmpn. part nec Guen.) At rest. Very common.

3900* *Acidalia actiosaria*, Wlk. At light. One female.

3916 *Acidalia sanguinaria*, Wlk. At light and at rest. Common.

3926* *Anisodes obrinaria*, Guen. At light. One male.
3951* *Erythrolophus hyriarius*, Wlk. At light. Common.
3958* *Rhodostrophia vinacearia*, Moore. At rest. Common.
3961* *Rhodostrophia pelloniaria*, Guen. At rest. One female.
3969 *Timandra amata, L., convectaria*, Wlk. *(amataria, L.)* At rest. One male.
3970* *Timandra correspondens*, Hmpn. At rest. Common.
4033 *Chlorodontopera discopilata*, Moore. At light. One male.
4061* *Hemithea aquamarina*, Hmpn. At light. Uncommon.
4073* *Comibaena (Geometra) pictipennis*, Btlr. At light. Uncommon.
4086* *Euchloris subtiliaria*, Brem. At light. Common.
4106* *Thalassodes veraria*, Guen. At light. One female.
4112* *Gelasma (Thalassodes) thetydaria*, Guen. At light. Uncommon.

Pyralidae.

4170* *Crambus argyrophorus*, Btlr. At rest. One female.
4172* *Crambus nivellus*, Koll. At rest. One male.
4177* *Crambus malacellus*, Dup. At light. Common.
4384* *Hypsipyla robusta*, Moore. At light. One female.
4478 *Orthaga aenescens*, Moore. At light. Not common.
4513* *Vitessa suradeva*, Moore. At light. One male.
4525* *Pyralis funebralis*, Warr. At light. Not uncommon.
4526* *Pyralis elongalis*, Koll. At light. One female.
4601* *Bostra marginata*, Wlk. At light. One male.
4683* *Aulacodes colonialis*, Guen. At light. Common.
4697* *Parthenodes vagalis*, Wlk. At light. One male.
4702 *Talanga sexpunctalis*, Moore. At light. Very common.
4735 *Stegothyris diagonalis*, Guen. At light. Very common.
4737* *Hyaloplaga pulchralis*, Moore. At light and at rest. Common.
4783* *Rehimena phrynealis*, Wlk. At light. Uncommon.
4786 *Zinckenia fascialis*, Cr. At light. Common.

4788* *Eurrhyparodes tricoloralis*, Zell. At light. One male.

4804 *Pagyda botydalis*, Snell. At light. Very common.

4819* *Marasmia trapezalis*, Guen. At light. Common.

4825* *Syngamia floridalis*, Zell. At light. One male.

4834* *Bocchoris onychinalis*, Guen. At light. One male.

4866* *Filodes fulvidorsalis*, Hbn. At light. One male.

4890 *Dichocrocis evaxalis*, Wlk. At light. Very common.

..... *Pilocrocis* spec. nov. near *coptobasis*, Hmpn. At light. Uncommon.

4971 *Sylepta iopasalis*, Wlk. At light. Not uncommon.

.....* *Sylepta derogata*, F. At light. One male.

4986* *Sylepta crotonalis*, Wlk. At light. Common.

4989* *Sylepta lunalis*, Guen. At light. Common.

5005* *Agathodes ostentalis*, Hbn. At light. One male. Much bigger than any of my Calcutta specimens.

5027* *Glyphodes celsalis*, Wlk. At light. One male.

5036* *Glyphodes zelimalis*, Wlk. At light. One female.

5054* *Glyphodes indica*, Saund. At light. Not common.

5055* *Pygospila octomaculalis*, Moore. At light. One female.

5056* *Pygospila tyres*, Cr. At light. Common.

5076* *Crocidolomia binotalis*, Zell. At light. Common.

5077* *Crocidolomia suffusalis*, Hmpn. At light. One male.

5082* *Sameodes cancellalis*, Wlk. At light. Common.

5107* *Isocentris coenostolalis*, Snell. At light. One male.

5134 *Maruca testulalis*, Geyer. At light. Common.

5138* *Tetridia caletoralis*, Wlk. At light. Not uncommon.

5151* *Pachyzancla licarsisalis*, Wlk. At light. Common.

5254* *Pyrausta incoloralis*, Guen. At light. One male.

In addition to the above, I still have a large number of species awaiting identification.

D. G. SEVASTOPULO, F.R.E.S.

Calcutta, 19th September 1935.

The Preparation of specimens of Bats.

BY

C. PRIMROSE.

(with 8 figures.)

The Editor, considering that notes on the preparation of specimens of Bats and other small Mammals will prove of interest to the members, has asked me to contribute such. He is one of my oldest and best friends so I will not quote from his letter but can only say that he has resorted to all legitimate editorial methods in trying to procure these articles. I can only trust that he is right, and that they will be of interest to a fair percentage of the members. I can honestly claim that the methods recommended have been thoroughly tested and proved by me, both when making a private collection and when working as a collector on the Mammal Survey that was conducted by the Bombay Natural History Society. Should these notes lead a single member to take up the collecting of Bats or small Mammals I shall feel amply rewarded. I also hope that such members as are already collecting small Mammals may find tips of practical value in them.

As my last note dealt with the ways and means that may most successfully be used in procuring specimens of Bats, it seems best that I should follow it up by describing the best method of preparing specimens of those animals and in a later article will deal with the preparation of specimens of other small mammals. I trust there is no member whose knowledge of Bats is similar to that of the school boy who in the Natural History paper answered the question "What do Bats do in the winter ?" by stating "Crack if not oiled." Any how it does not matter as any such will not have attempted to read my previous article and will probably, yes, quite probably, "Crack if not oiled."

I have another good reason for dealing separately with the preparation of Bats and other small Mammals, in that I have found different methods of skinning have to be

carried out if the best specimens of each class are to be obtained. I shall therefore, in this article, describe the method of skinning Bats which I have found from practical experience enables the most perfect specimens to be made. For all other small Mammals a different method of skinning proved most successful and it is that method which I will describe later. The method of skinning Bats which I eventually selected was the outcome of a keen desire to produce specimens as near perfection as possible. This desire is no doubt, common to all field naturalists and I trust I need not remind them that they should aim at obtaining nothing but perfect specimens always and, with regard to such, should consider that "the best is only just good enough." Had I been less keen on the *quality* of specimens in my collection the method I am about to describe might still have been undiscovered. Readers who consider I am blowing my trumpet unduly loudly will oblige by quoting the name of book or article in which the same method of skinning has been described, and advocated, for the preparation of specimens of Bats. Until such irrefutable evidence is forthcoming I shall, emulating our American cousins, describe the method as "Primrose's method of skinning the Chiropteridæ." I was aware, from actual experiments carried out in 1915, that almost any small Mammal could be skinned by this process. When in Russia in 1919 I was very interested to find that the same method of skinning was employed in the Fur trade in animals, anyway up to the size of the Otter of which I saw many skins that had been thus removed. That the North American fur dealers skin in the same way seems very probable, as this method of skinning, without any incision of the skin, yields perfectly undamaged pelts.

Why it has not been applied before to the preparation of specimens of Bats by our keen and learned collectors I cannot understand unless it is due to the British trait of super-conservatism. I am inclined to think that this is so as I sent some of the early specimens, thus prepared by myself, to the Bombay Natural History Society for a criticism on them. Their reply was brief, and typically

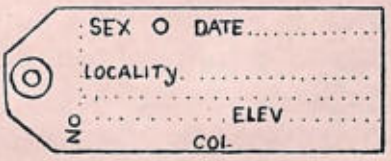
British to the effect that, whilst they wished to warmly congratulate me on the excellence of the specimens they would point out that the British Museum authorities considered the normal method of skinning, by making an incision down the belly, the best. As after this I shall describe the method of skinning approved of by the British Museum, my readers can please themselves. For *Bats* I am convinced that the method of skinning which I shall now describe is *the ne plus ultra* of methods in that line.

Taking things in their proper order I must first touch on a matter of vital importance in regard to any specimen and that is the scientific data concerning it. The need for absolute accuracy with regard to such data cannot be over emphasised. Without such data any specimen, however perfect, loses the greater part of its value. The data required for Bats, are :—

Date on which specimen was secured ; Sex ; Locality ; No. of specimen as per Collectors' Journal and the following measurements given in millimetres ; Head and Body ; Tail ; Forearm and Ear. With the collector's name the data are completed. These data are written on a label attached to the specimen and a copy kept in the Journal in which, more space being available, fuller details can be entered. These data must be attended to *before* skinning the specimen. My early experience taught me to be cautious as I found that writing the data on the label and in the Journal often caused trouble and waste. Many specimens, from faulty skinning or other causes, are spoilt and have to be thrown away and in that event a good label is wasted and the erasure in the Journal makes it untidy so it is best to first write the data on a piece of paper and place it in the Journal and thus conserve ones temper and labels. Labels can be home made or obtained printed from a press, if one can afford it, the latter are certainly preferable, being neater and more uniform. They should be made of a good quality of *tough* paper and the hole, through which the string that attaches them to the specimens, reinforced. The

illustration shows both sides of such a label of a convenient size and form for all small mammals. Larger sizes look better on the bigger beasts such as, Civets. etc.



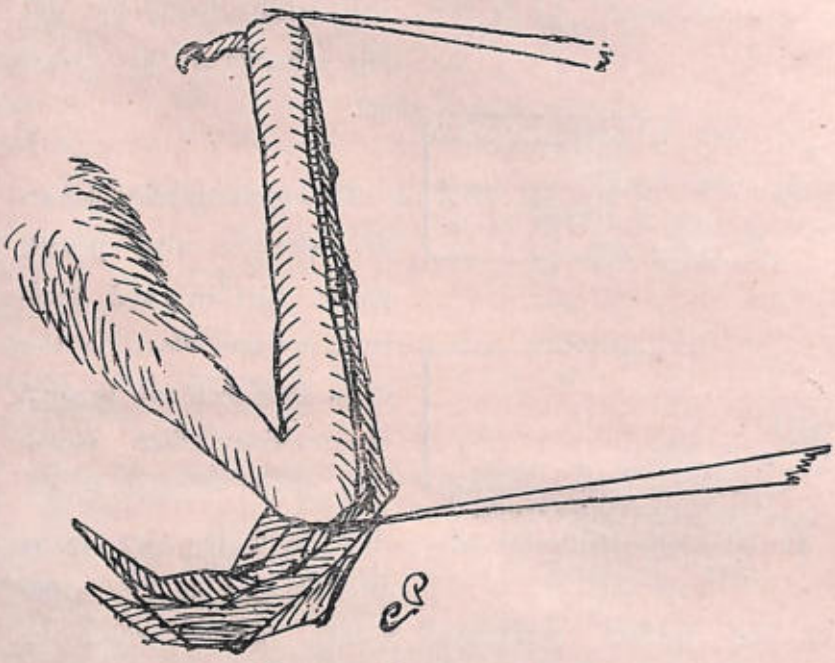




The upper label is for skulls.
The others show both sides of labels for tying to specimens.

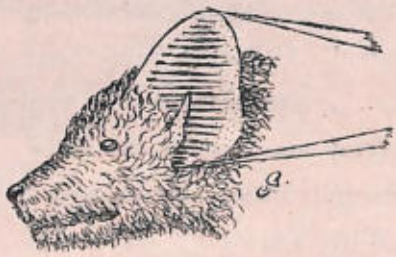
The specimen being before us, together with pencil, paper, dividers and footrule, we now start on the data. Date, sex and locality can go down first. Great care should be taken to see that the locality given is as clear as possible, the name of the nearest permanent village, named river or mountain, on a Government Map being made use of to describe it. The elevation of the spot should be as accurately given as possible. Those who have read the old Fauna volumes are aware how vaguely localities have been used, such as Nepal, Sikkim etc., by our pioneer collectors and this has led to much controversy and doubt so avoid their errors. There now remain the measurements which must be *absolutely accurate*. Turn the Bat on its back and straighten its neck till its lower jaw is parralell with the surface of the table; adjust the dividers till one point is touching the nose and the other the root of the tail which is about the posterior edge of the anus. Check this till you are certain of the accuracy and then measnre it on the footrule and enter it on the paper against H and B. Now

measure the tail keeping it as straight as possible while doing so and check it for accuracy. Now turn the specimen over and measure the forearm, as illustrated and



FOREARM MEASUREMENT.

then the ear. Note that absolute accuracy is *essential* so that if the tail or both forearms or ears be so damaged as to render accurate measurements impossible such should not be attempted and a note (severely damaged) entered on the label. The data having been entered on the paper, which we now place in the Journal, the work of skinning can be started.



MEASURING THE EAR.

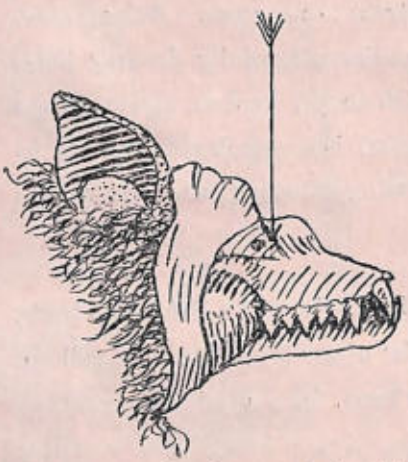
The following are required for this process, A sharp penknife and, if available, a used safety razor blade in

holder, a pair of sharp nail scissors, forceps, cotton wool, arsenical soap, a fine needle, thread and a sliver of bamboo about the size of a lead pencil. As during the process our fingers frequently get soiled with blood and grease, a piece of rough Turkish towelling should be kept to wipe them on.

In this method of skinning no actual incision is made in the skin, advantage being taken of a natural orifice, the mouth, through which to extract the carcase. Before starting to skin examine the specimen carefully for shot holes and plug all such carefully with cotton wool to render them blood tight. If this precaution is overlooked blood will be forced through these holes, during skinning, and damage the specimen considerably.

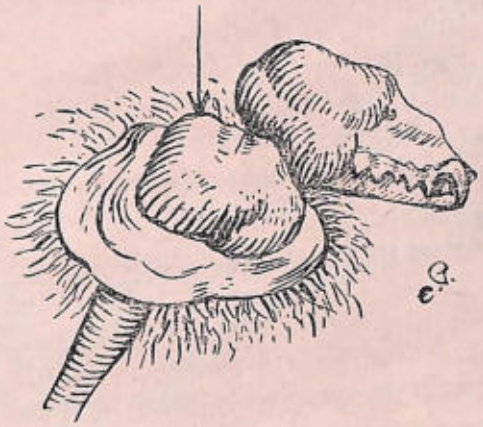
We will now start skinning. Place the Bat on its back, open its jaws and fold back the upper lip as far as it will go. Now cut closely towards the bone, from a point above what would be in a human being a wisdom tooth, and continue round to the opposite side of the upper jaw ; the delicate nasal cartileges will be encountered in the centre of the jaw and care should be taken, when severing these, to avoid cutting through the skin. Keep some cotton wool handy as blood very often flows from the nasal cavity when the cartileges are severed. This should be promptly wiped off. Continue to press back the lip with the nail of the forefinger and thumb of the left hand and ease it away from the flesh by cutting judiciously with the knife, always towards the flesh. When the skin has been eased away to a point just below the eyes it can be left *pro tem.* and the lower jaw tackled. This is very simple indeed and no accident is likely to happen provided one always cuts towards the bone. When the lower jaw has been skinned

to the last molar, the points below the eyes, where the lining of the mouth is attached to the muscles of the jaw, will arrest further progress. Pressing the skin of both upper and lower jaws back towards the neck sever through the portions which are holding it back ; that will allow of the skin being pressed further back but its attachment to the eye sockets will now have to be severed. Press the skin firmly back and cut through their attachment, carefully cutting away from the skin. Sharp pointed scissors can often be used in this operation. This attachment having been severed you will find that the cartilege of the ears now require attention. Again press the skin back as far as it will go and cut clearly through it at the base of the ears ; here again cotton wool should be kept handy as, without practice, the jugular vein is often severed, resulting in a copious flow of blood which may soil and damage the skin. Press the skin down to the base of the neck using the knife point judiciously *towards* the flesh to sever the attachment to the muscle. Before the body can be extracted the wings have to be severed from it at the shoulders. To do this draw the skin of the mouth towards the shoulder to be operated on and at the same time press the upper arm upwards and towards the neck, easing the skin downwards with the nails of forefinger or thumb. With some



Before severing ligament attaching eyelids to muscle.

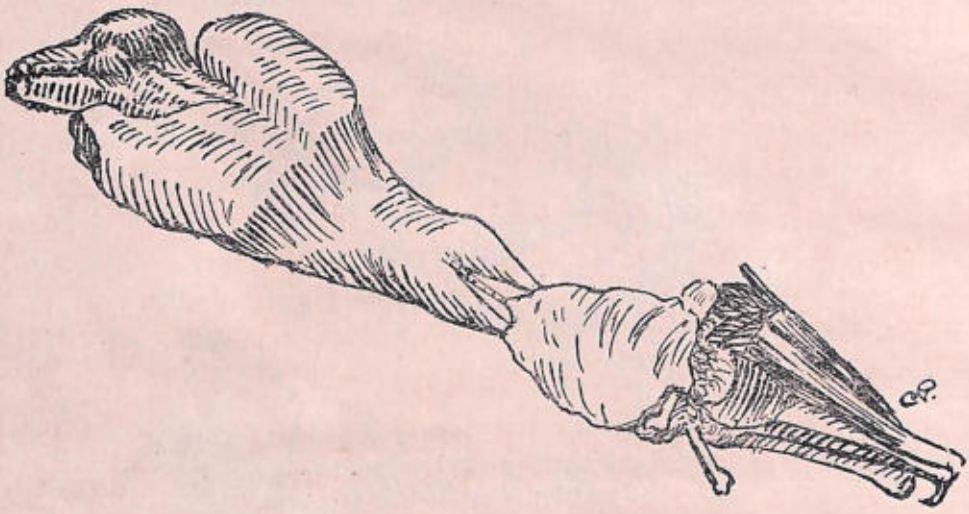
coaxing the point of the shoulder will be made to protrude above the leril of the skin when the joint should be carefully



Point of shoulder pushed up preparatory to severing wing from body.

judged and the ligaments partly severed with the knife. That will allow of the upper arm being pushed still further up and, with a judicious severing of the pectoral muscles, it can be pushed up until the scissors can be inserted under and over the armpit and the joint cut through, severing the wing from the body. Here again veins will be encountered and cotton wool should be handy for instant use. One wing being now severed it makes it much simpler getting at the other one and though the method is exactly the same it will not be found nearly as difficult Both wings having been severed, the lips, which have no doubt stretched somewhat by the manipulation they have undergone, will be found large enough to pass the rest of the torso through without any difficulty. Pushing the skin, with the nails, towards the tail and using the knife judiciously and lightly, especially over the solar plexus and under the lowest ribs, it can, soon, easily be coaxed down to the legs. Taking it still further down, with use of the nails, till the upper portion of the leg and tail bone is exposed, the arms and genital orifices have to be cleanly cut through, which is a simple matter, A snip of the scissors then severs the legs

at the hip and a slight pull on the tail bone brings it cleanly away in its entirety.

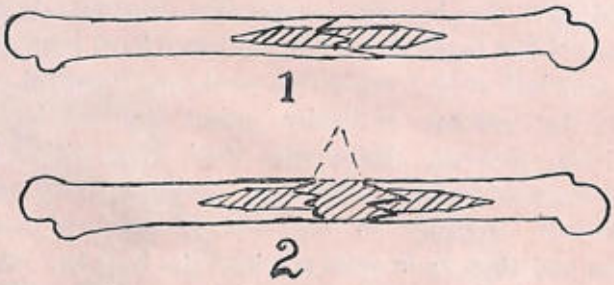


SPECIMEN SKINNED TO POINT WHEN LEGS SHOULD BE SEVERED.

Nothing now remains to be done but to remove all flesh from the wing and leg bones and remove all flesh and fat from the skin. We will take a wing first. Grasping the severed end with the fingers of the right hand ease away the skin from the muscle, with the nails of the middle finger and thumb of the left, aiding the process by pulling with the right hand. The knife will have to be used occasionally to detach the skin from the muscle when it cannot be done by the nails. The skin will have to be eased over the elbow joint mainly with the nails and now and then a touch of the knife. The process is continued till the skin has been pressed down right up to the wrist. The knife and the scissors are then used to remove all flesh from the fore and upper arm and when only the clear bone remains it should be painted over with arsenical soap prior to wrapping cotton wool over them. When removing the flesh from the bones take care to see that the tendous, joining the humerus to the fore arm, are not severed so as to separate the limb at the elbow. If that is done it causes considerable difficulty and constant practice is required before a neat job can be

made by the use of a wire, sharpened at both ends, being inserted into the humerus and radius respectively to take the place of the tendons, After the bones have been painted with arsenical soap wrap cotton wool over them till you are satisfied that you have skillfully copied the muscles which have been removed. Paint this wool over with a liberal coat of arsenical soap and draw the limb back into position. Examine it carefully to see that it has been correctly returned and that, as is quite possible, the bone has not been twisted round before returning it to position. The other wing is, of course, treated in exactly the same way, quite a simple matter, if the bones are intact, but not if they are not which is frequently the case. Firstly, if the puncture has caused a bone to protrude through the skin, it should be carefully eased back under the skin *before* skinning. Even so it is very liable to be displaced when one has skinned up to the break and when this occurs the bone should be carefully manipulated into place again. Always, when dealing with a wing in which a bone or bones are broken, avoid brute force ; a little patience and light handling will overcome the trouble caused by broken bones, and provided either humerus or radius (the ulna is rudimentary in Bats) have not been broken right up against the elbow joint the matter is simple. Remove the flesh as usual and the two pieces of bone having been cleaned examine the base of the hollow filled with marrow ; the two pieces can be successfully joined by inserting a piece of bamboo or match into their hollows. At the centre it should be made of a thickness which is slightly larger than the bone of the two pieces to be joined and of such a length that at least $\frac{1}{4}$ inch is imbedded in the bone of either piece. If the fracture is a simple one the bamboo should be so made that, whilst fitting fairly tightly, both bones can be brought together over it to the point of fracture. If the break is severe, and you consider a portion of bone has been entirely destroyed, leave a portion in the centre of the bamboo equivalent to the length of the lost portion and of too great a thickness to enter the bore of the bones. The diagrams

will, I hope, show clearly what I have tried to



JOINING BROKEN BONES.

1. Simple fracture.
2. Severe fracture.

The shaded portion shows bamboo; note extra length in middle of No. 2.

explain in words. Presuming the wing bones to have been duly returned, as a test of their being in order, they should be pulled out again to their full extent and left there till the legs have been cleaned and all flesh and fat cut away from the skin. A few scrapes of the knife is sufficient to remove the little flesh there is on the leg bones which should be skinned to the ankles. The same simple care should be taken to see that the tendons of the knee are not severed. Now, with a pair of good sharp scissors, embroidery for preference if the Bat is small, carefully cut off all fat and flesh on the skin being careful not to cut the latter during the process. When this is done paint the skin throughly with arsenical soap. (Arsenical soap should not be used as a paste but liquid as in that form it penetrates most rapidly through the skin and is most effective.) Wool having been wrapped round the leg bones and these returned to position, the wing bones should be returned to position also. By pulling the membrane between the legs the same can be drawn out to its full extent and the wings having been given as final look to, to remedy twisting, the specimen can be held by the lips and a puff of air blown into it should make you feel proud of your handiwork and anxious to start stuffing it.

A sliver of bamboo shaped to size, and rather longer than the original tail, should be coated with soap and carefully

inserted into the space in the membrance where the real tail was. A puff of air, blown into the skin, will help by separating the skin of the back and belly which otherwise stick together and make it difficult to push the bamboo into position. With frequent puffs to help, and using a bamboo rammer, press cotton wool down to the rump and lower belly, bearing in mind while doing so, the original proportions of the Bat which you wish the completed specimen to exactly represent. Keep doing this, constantly studying the shape, which should not be, in any way, spoilt either by over or under stuffing. You keep on pushing more down with the bamboo or removing some with the forceps until you are satisfied that your specimen looks exactly what it was when you took the first measurement. So you continue until you have filled the head and upper and lower lip so that, when closed, they will be exactly as they were before skinning. With needle and thread stitch the mouth neatly up, starting at one corner of the mouth and ending at the other. While doing so it will generally be found that a little more wool is required, here and there, to make the muzzle the exact shape it was in life. When the last stitch at the corner of the mouth is finished knot it neatly and snip the thread off close. In stitching the needle should be inserted through the lips, from the flesh, and pulled out on the fur side, the stitch being a simple cross. The specimen, which should meet with your full approval, is now ready for pinning out. But a very important part of it requires attention, the skull. Carefully remove the head from the body with knife, using both scissors and knife to remove the tongue; with a brain scoop (easily made by flattening the end of a piece of galvanized wire and bending it, with the pliers, till it resembles a miniature "putting iron") remove the brain cleanly through the orifice at the base of the skull. Remove the eyes and, if the specimen is large, some of the muscle on either side of the head, taking care to leave enough to keep the lower jaw attached to the skull; further cleaning can be done as the skull dries.

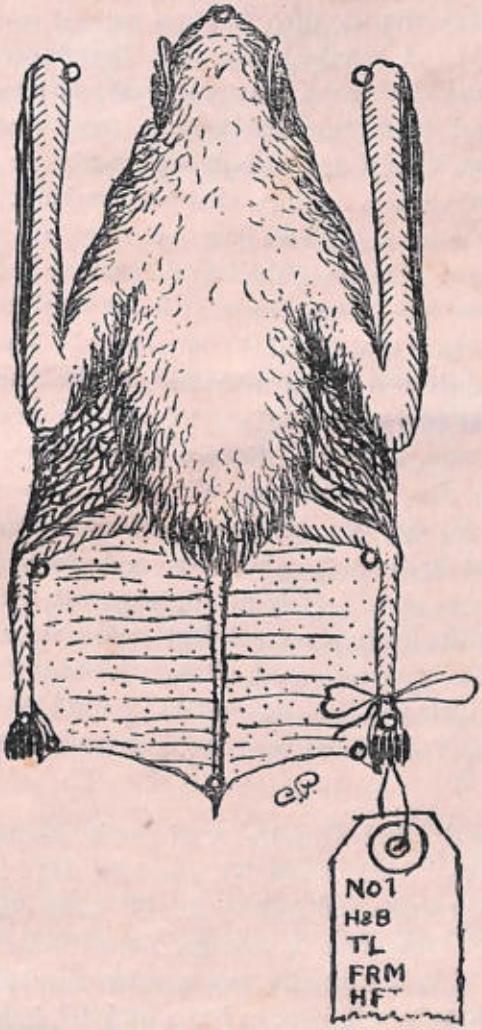
Now take your paper with the data and copy into the Journal, which should be ruled in columns headed. No.;

Sex; Date; Locality; Elevation; H and B; Tl.; Frm.; H. F.; Ear; Species and Remarks respectively. The "No." is merely the Serial No. showing the order in which the specimens were collected the first being No. 1 and so on. In the Remarks column should be entered any notes of interest such as description of characteristics of flight, nature of food, time of year when commonest etc. A separate note book should be kept for entering fuller particulars regarding any species when long and careful observation enables you to do so.

Now enter the data neatly on the label and attach it securely to the right ankle; on the skull label all that is necessary to enter are the serial No., Sex and Date and your initials. This label is tied firmly to the lower jaw between the canines. The specimen is now ready for the final process of drying after being pinned out according to the method approved of by the British Museum.

For the purpose a board of soft wood into which pins can be pushed, without difficulty, is required; the top of a tea chest of Simul wood is satisfactory. Place the specimen on its belly and first push a pin neatly through the tip of the nose and pin it to the board; push another through the bamboo which has replaced the tail about 1 millimetre from the tip; lift it, with tail and membrane attached, and push the pin in the wood, in such a position as to ensure the tail being in a straight line with the tip of the nose, so that a line drawn down from the nose through the centre of the Bat would touch both pins. With pins push the legs, behind the knees, outwards to stretch the membrane between and pin in place; push pins through each foot and pin it so that the bone, from the knee down, is parallel to the line between nose and tail. Push pins through the base of the thumb of each wing:and, before pinning, lift the wing and fold the fingers and membranes so that, when pinned for drying, they will not lie a cross any part of the belly of the specimen. Pin down so that the fore arm is parallel with the lower bone of the leg, pushing the thumb under the wrist when so doing. On the side of the foot nearest

the tail will be found a flexible bone like piece which serves the purpose of stretching the membrane to its full extent, push a pin close to it, and near the edge of the membrane, stretching the latter by pushing the pin away from the tail, pin in position close to the foot. The tyro may safely use the illustration to help him in pinning out a



specimen and need not be afraid of using pins to enable him to set his specimen "just so". The specimen having been pinned out the skull should be pinned alongside by passing a pin between the zygomatic arch and the skull, opposite the eye.

Both are how ready to be dried in the shade but some work still remains to be done before they can be transferred to the storage case and very important too. If unattended, when drying, the ears, and in the case of Leaf nose and Horse shoe Bats, the membranes from which they take their names, cockle up and twist till they look vastly different to what they did in life. With a pointed pair of smooth faced forceps and manipulation with the finger tips they can be coaxed, during the process of drying, to retain, exactly, their original shape ; thus manipulation should not cease till the specimen is quite dry when it can safely be pinned in the storage case, a perfect scientific specimen. One more important matter and I have done, no there are more than one, they are :—Cleansing the fur of blood and dirt. From actual experience I have found that the simplest way to do this with Bats is to wait till the specimen is dry and then use one of their own combs on them. Besides hanging head down by the curved claws of their feet, these serve, and are constantly used, as combs. From a badly damaged specimen, of medium size, cut the leg off at the knee with foot attached, and dry it. When a specimen has to be cleaned of blood and dirt take it, when dry, and comb the blooded portion of the fur, briskly but lightly, with the dried foot. Blow away the finely powdered dust, removed by the claws, and continue combing until clean, which won't take long. With very little practice one can make a good job of it. The foot will also be found very useful in combing the fur into its natural lie.

During the time when the specimen is drying see that it is protected from Crows, Kites and Pie dogs, all of which are prone to remove and destroy it. Of protecting it from Ants, which are often a scourge, I shall write in my next article and if, in the interim, any member should be induced to collect Bats he will have to learn, as I did, how to protect his specimens from those pests. I also had to learn, by the simple, though effective, process of trial and error, all I have endeavoured to impart in this note. With this, as with every other form of Sport, Art or Science "practice makes perfect" and I advise those who take up Bat collecting to "practice,

practice, practice". When they can turn out as perfect specimens as I was able to do they will have every reason to be pleased with their work.

Though my readers may not think so I honestly hate ink slinging and only the fact that the Editor is a personal friend and that I consider it the *duty* of *all* who have anything to offer for the good of Natural History in general or field naturalists in particular, to do so that has induced me to contribute this note on the "Primrose method of skinning the *Chiropteridae*." The labour it has entailed makes me feel I must get "oiled to avoid cracking" and so *Finis*.

Cause of Elephants turning Rogues.

The Editor,

SIR,

I was very interested in Mr. S. K. Ghosh's article in the October Journal as to the probable cause of Elephants turning Rogues. Having never had any chance of shooting a Rogue, nor having seen such shot, I wrote to my friend Mr. R. C. Morris who has shot many Rogues, seen many others shot and been able to examine them, asking him to let me know what he thought of Mr. Ghoshs' theory. From his reply it appears that Mr. Ghosh wrote the Bombay Nat. History Society about the matter and they in turn referred to Mr. Morris who was kind enough to send me a copy of his reply to them with his permission to send it to you for publication should you care to do so. Mr. Morris write as follows ;—

DEAR PRATER,

I am sorry I have been so long in replying to your letter of the 6th instant enclosing a letter from Mr. S. K. Ghosh, I. C. S., District Magistrate, Rangpur, which I herewith return.

While agreeing with Mr. Ghosh that in many cases tusk disease is the cause of many elephants turning into rogues, this is by no means the cause in all cases, in fact most of the elephants I have shot, or helped to shoot, have no apparent disease in the tusks. Marginal gum disease of elephants is very commn, occurring in the case of both wild and tame elephants, probably due to food-packing under the gum, but this would not account for elephants turning into rogues. Frequently inflammation from old and fly-blown wounds is the cause (the last rogue I shot had its tail bitten off and the stump was diseased). Again in some cases there is no apparent reason for the elephant having become a rogue. In 2 cases this was undoubtedly due to the elephants tusks being crossed, resulting in difficulty in feeding. Only in 2 cases was I sure the elephants' ill-temper was due to tusk disease. That elephants with tusk disease do thrust the diseased tusk into ant-hills and young trees is correct. A broken end of a tusk, about a foot long, was brought to me some years age, the Sholaga had found it wedged firmly into a tree, and Sir Frank Colyer, to whom I sent the tusk, expressed the opinion that the elephant had been suffering from toothache.

Seven or eight rogue elephants have been shot in the Madeswaranmalai Reserve, in this district, in the past 10 years, one of these was definitely handicapped having tusks crossed so close to its jaw that the elephant must have experienced considerable difficulty in feeding itself, but the others were healthy animals and I put their ill-temper down to the fact that their favourite grazing grounds bordered a much frequented pilgrim path up to the famous Madeswaranmalai temple. Nearly every day devotees journeying up and down this path create a good deal of noise, especially once a week, and I think that this continual row used to irritate solitary elephants frequenting the bamboo jungle there. In every case the elephant was proscribed owing to its adopting an aggressive attitude towards pilgrims on this path.

R. C. Morris.

P. S.

I am convinced that one of the chief causes of elephants turning into rouges, now-a-days, is due to ryots firing at elephants raiding their fields. The herds are nearly always led by a bull. The ryots, who now nearly all have guns, cannot be blamed for their action in this respect, and it is up to Government to, I think, create a Game Department, who will take measures to prevent the continuous raid on fields during the harvest time, by an increasing number of elephants, that is now going on.

R. C. M.

November 1935. C. Primrose.

