



PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

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THE HONORARY SECRETARIES.



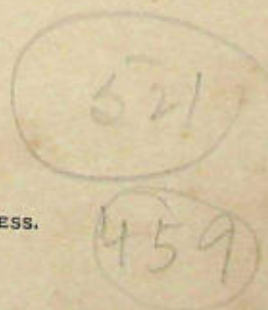
JANUARY TO DECEMBER,

1874.



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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JANUARY, 1874.

The Monthly General Meeting of the Society was held on Wednesday, the 7th instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentation was laid on the table :

From E. C. Atkinson, Esq., a List of Kumaon Plants by Dr. Watson.

The Secretary read a memorandum from Mr. Atkinson asking any member interested in the subject to add to or correct the list for the final list to be incorporated with the Kumaon Memoir.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected ordinary members—

C. F. Magrath, Esq., C. S.

J. L. Peppé, Esq.

C. Heintze, Esq.

The following gentleman is a candidate for ballot at the next meeting—

Dr. C. J. Jackson, Sanitary Commissioner with the Government of Bengal, proposed by Captain J. Waterhouse, seconded by Dr. T. R. Lewis.

The following have intimated their desire to withdraw from the Society—

W. Eddowes, Esq., M. D.

G. E. Ward, Esq., C. S.

C. Brownfield, Esq.

Col. F. H. Rundall, R. E.

Mr. H. B. Medlicott exhibited five specimens of the Khairpūr Meteorite of the 23rd September, 1873, and read a description by the Rev. M. Yeates.

The Council reported that they propose Mr. Jules Schomburgk as an Associate Member of the Society on the grounds of his knowledge of Indian Architecture and his scientific skill in illustrating Indian Palaeontology.

The President announced that the lectures to be given during the month of January, would be—

On the 14th, by the Hon. J. B. Phear—"On Glimpses of Old India as seen through the pages of Manu."

On the 28th, by Mr. H. F. Blanford—"On the Winds of Northern India."

The following papers were read:—

1. *On a Secondary Sexual Character in Squilla raphidea*, Fabr.—By J. WOOD-MASON Esq.

This note will be included in a paper on Indian *squillide*.

2. *On the application of Electro-deposition to the Correction of Engraved Copper plates*.—By CAPT. J. WATERHOUSE, Assistant Surveyor General.

Those acquainted with the practical details of the production of copies of maps, plans or drawings by lithography or engraving, are only too well aware of the necessity for making alterations on the stones or plates, either for the correction of mistakes and carrying out changes made during the progress of the work, or for the insertion of additional details in successive editions after it is completed.

In engraving or lithographing copies from pictures or drawings, corrections are seldom necessary if the engraver or lithographer possesses the necessary skill, and has been furnished with a properly finished drawing to copy from; but in the case of geographical maps, the constant changes of boundaries, and the opening of railways, canals, roads and other administrative improvements, necessitate continual alterations of the plates in order that they may be correct and complete at the time of their publication. It is always undesirable to make these corrections on a finished map, but when necessary they may be made without difficulty on a stone or zinc plate, because the drawing is only on the surface and can be easily removed; on an engraved copper-plate however, it is a different matter, because the lines forming the drawing are cut deep into the metal and must be erased entirely before any alteration can be made, leaving a hollow which has to be filled up again in order that the even surface of the plate may be restored and made fit for the new work to be re-engraved.

The usual way of doing this is by what is technically called "*knocking up*," i. e., carefully hammering the plate from behind on a polished steel anvil till the hollows are filled up, and the surface of the corrected parts of the plate perfectly even with the rest.

This method is simple but has two great defects—

1st. However neatly and carefully the knocking up may be performed,

it damages the engraving in the parts surrounding those erased, sometimes to a wide extent, and thus necessitates considerable labour and loss of time in retouching and restoring the damaged work.

2nd. The hollows formed at the back of the plate by the hammering, render the plate of an unequal thickness, causing difficulty in the re-engraving, springiness in the printing, and greatly increasing the wear of the plates in the vicinity of the corrected parts.

In the English Ordnance Survey Office and other institutions where special appliances exist for reproducing electrotype copies of the engraved plates, this injurious method of 'knocking up' is in some cases superseded by scraping off the faulty details from the intermediate *relief* copy of the original plate and then obtaining from it a fresh electrotype plate on which the parts that have been removed are represented by a smooth face of copper. This system is entirely free from any injurious effect on the original plate but is tedious and expensive.

So long ago as July 1856 Marshal Vaillant brought to the notice of the French Academy of Sciences an ingenious method invented by M. George, an engraver in the Topographical Bureau of the *Depôt de la Guerre*, who proposed to avoid the defects of both the above systems by the electro-deposition of copper in the hollows formed by the erasure of the names, lines or other detail to be corrected. Alterations can thus be effected without the risk of damage to work already done on the plate; the uniform thickness of the plate is preserved; the time required for carrying out the corrections is little more, and in some cases less than would be occupied in knocking up; while this method is always quicker and more economical than the plan of scraping details from the relief plate and then re-electrotyping.

This valuable process is largely used at the *Depôt de la Guerre*, Paris, but so far as I could ascertain, it is but little known in England, and though I have visited some of the principal geographical establishments in Europe, the only other institution in which I saw or heard of anything of the kind was in the Military Geographical Institute at Vienna.

As the method I have adopted is in a measure, a combination of the Paris and Vienna systems, it will be advisable to give a brief description of both.*

In M. George's method the engraved plate is first of all covered with a thin transparent bituminous varnish or etching ground. The parts to be corrected having been carefully and cleanly cut out, the cuts are surrounded for about half an inch, with a thick coating of Brunswick black, and the remainder of the plate all but one corner is thickly coated with wax. A trough

* Full details will be found in my "Report on the "Cartographic Applications of Photography" of which there is a copy in the Society's Library.

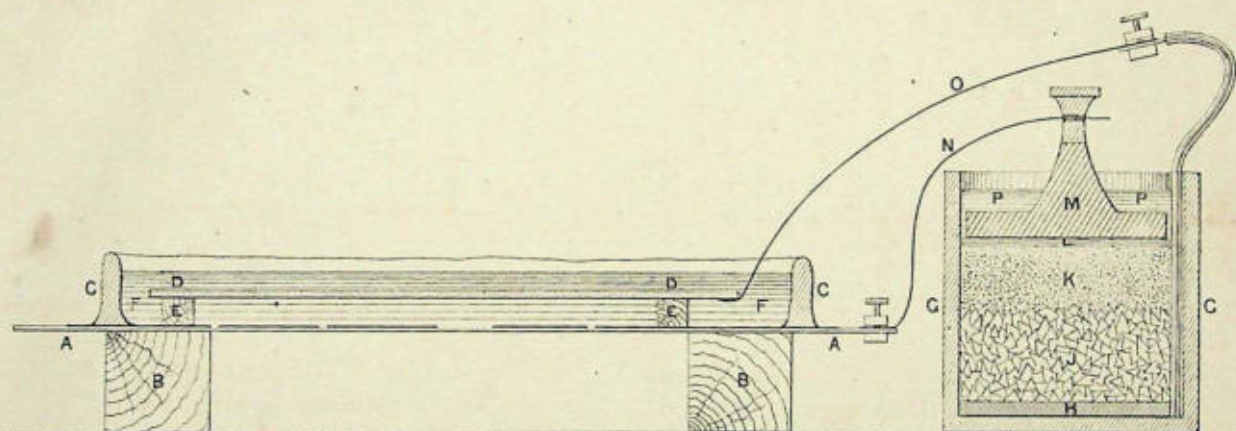
about $1\frac{1}{2}$ inch deep and corresponding in size to the extent of the required corrections is made on the plate by means of a strip of bordering wax and the plate is placed in a level position upon wooden blocks. The trough having been filled with a solution of sulphate of copper, one or more small cylindrical porous cells about 2" high and 1" in diameter are placed in position a few inches from the cuts; their number varying according to the extent of the corrections. A rod of zinc to which is attached a copper band, is placed in each cell, the free end of this copper band being attached to the uncoated part of the plate outside the trough, the circuit is completed by pouring a little very dilute sulphuric acid into the porous cell. The deposition of copper in the cuts then commences and in the course of 24 to 48 hours entirely fills them up and forms a ridge of copper all round them. The solution is then poured away, the wax wall and coating are removed and the surface of the plate having been protected by fastening strips of waxed paper round the corrected parts, the superfluous deposit is carefully filed down till it is no thicker than the surrounding paper and the remainder is removed with a sharp engraver's scraper. If this operation is skilfully performed, the surface of the corrected parts should be left perfectly even with the remainder of the plate and without a trace of damage to any of the surrounding work.

The method used at the Military Geographical Institute in Vienna differs considerably from the above but is equally effective. The engraved plate is first of all silvered by rubbing over it a solution of nitrate of silver in cyanide of potassium with a little tripoli powder. The parts to be corrected are then cut out and the plate placed in the depositing trough of the electrotyping apparatus ordinarily used at the Institute.

After the lapse of a few days a sheet of copper is deposited over the whole of the plate, and when the deposit is of sufficient thickness to fill up the cuts, the plate is removed from the trough. The deposited metal immediately above and around the parts to be corrected is then scraped down with a curved scraper till it is quite thin, when the covering sheet of copper is stripped off the engraved plate, leaving a slightly raised ridge over the corrections, which is removed with the scraper as in M. George's process.

This method is neither so simple nor so economical as M. George's, and the only advantages it would appear to possess are uniformity and regularity of action, as well as the perfect protection afforded by the deposited sheet of copper to the engraved plate during the removal of the superfluous metal.

In India, the rapid extension of railways, roads and canals, the frequent revisions of boundaries and the conflicting systems of orthography necessitate constant changes during the progress of the engraving of the Sheets of the Indian Atlas, and the necessity for adopting some such plan for making these corrections became apparent a short time ago, when happening to pass



Scale One-Fourth.

REFERENCES.

- | | |
|---|--|
| A A. Engraved Plate | I. Insulated wire attached to Disc of Copper |
| B B. Wooden blocks supporting the Plate | J. Crystals of Sulphate of Copper (about 1 lb.) |
| C C. Wax wall | K. Saw-dust |
| D D. Copper Anode | L. Felt |
| E E. Blocks supporting do. | M. Disc of Zinc with Brass Binding-screw. |
| F F. Solution of Sulphate of Copper. | N. Copper band from do., attached to Engraved Plate. |
| G G. Stone Jar of Battery | O. Copper band from Copper, attached to Anode |
| H. Disc of Copper | P P. Water. |

through the engraving rooms of the Surveyor General's Office I observed that a plate on which numerous corrections had been made by the ordinary process of "knocking up" was consequently much disfigured by hollows and inequalities all over it, and finding that there was a very valuable plate of hill work, on which a boundary had to be altered, I proposed to try whether this could be done by the system I had seen working in Paris, and thus avoid the almost irretrievable damage the plate must otherwise have sustained.

At first M. George's method was tried, but not knowing the exact proportions of his solutions, nor being able to procure the same kind of porous cells, the early attempts did not succeed very well, and as there appeared to be other difficulties connected with working the single cell system, it occurred to me that the use of a separate battery might give better and more certain results. After a few trials, perfect success was attained by the following method which is scarcely less simple than M. George's, and much more economical than that practised in Vienna, while securing some of its peculiar advantages.

The engraved plate is prepared almost precisely in the same manner as in M. George's method, *i. e.*, it is first covered with a thin asphaltum varnish, the parts to be corrected are carefully cut out and the remainder of the plate, with the exception of one corner, coated with Brunswick black,* a double coat being given on the part of the plate surrounding the cut to the distance of about 4 or 5 inches. When this coating is thoroughly dry, a strip of bordering wax is securely fastened down on the plate at a distance of about 2 or 3 inches all round the parts to be filled in, forming a water-tight trough about $1\frac{1}{2}$ inch deep. (See Plate I.).

The battery is of the pattern in ordinary use in the Indian Government Telegraph Department known as Menotti's modification of Daniell's battery. It consists of a stoneware jar containing at the bottom a disc of lead or copper to which an insulated copper wire running up the side of the jar is attached. Above the disc of lead is a layer of crystals of sulphate of copper, then some saw-dust covered by a piece of felt over which is placed a thick disc of zinc with a brass binding-screw attached. To set the battery in action, the jar has only to be filled with water, and thus all messing with acids and disagreeable fumes are avoided. The bare corner of the plate and all the connections of the battery having been carefully cleaned, the zinc pole is attached by means of a narrow copper band to the clean corner of the engraved plate. A solution of—

Sulphate of copper,	5 parts
Sulphuric acid,	1 "
Water,	30 "

* The object of coating the whole plate with Brunswick black is to preserve the surface from injury in case of leakage from the wax trough.

is poured into the trough and any air bubbles that may appear in the cuts are gently removed with a clean camel-hair brush. A piece of clean sheet-copper, large enough to entirely cover the parts to be filled in, and attached to the copper pole of the battery by a copper band previously soldered to it, is laid down above them at a distance of about half an inch, being supported in position by wax pellets or pieces of wood fastened to the plate with a little wax. The circuit being thus completed, the deposition of copper in the cuts commences and fills them up completely in the course of 18 to 24 hours. To ascertain whether the deposit is sufficient, a little instrument like a fork with three prongs of equal length, is used; the centre prong being placed in the cuts the other prongs should be quite clear of the plate on both sides. When the deposit is sufficiently thick, the battery is disconnected, the copper solution poured back into its bottle, the wax wall removed, the Brunswick black cleaned off with turpentine, and the superfluous deposit is removed exactly as in M. George's system by filing it down with a bent flat file, the plate being protected meanwhile by a mask of stout paper fastened down with Brunswick black. After filing to within the thickness of the paper, the remaining deposit is carefully scraped off till the even surface of the plate is restored. As the success of the operations entirely depends on the perfect adherence of the deposited copper to the original plate, every precaution must be taken to avoid the presence in the cuts of the slightest trace of grease or other matter which might cause non-adherence. The cutting tools must be quite clean and the cuts should be made with clean square edges. The sooner the filling in is performed after the erasures have been made the better. When the cuts are a day or two old, and in all cases where any doubt as to the perfect cleanliness of their surface exists, M. George recommends that the metal should be slightly bitten by means of a Bunsen battery, but I have found that the acid solution of sulphate of copper effectually removes all tarnish and oxidation, if not too old.

My practical acquaintance with the subject of electro-metallurgy and the experience we have yet had in working the method are too limited to enable me to state positively the advantages of the system I have adopted over those practised in Europe, but it has already been applied with complete success in the correction of two very valuable plates, and seems likely to prove of great service when extensive corrections have to be made. It is quite as simple as M. George's method and appears to possess the advantage of securing a more regular deposit over an extensive surface of the plate, the only precaution necessary being, to proportion the size of the anode to the extent of the work to be performed, so that the whole of the erasures are covered by it. In this respect it appears equal to the Vienna method but is much more rapid and economical in operation, though it loses the advantage of the protection afforded to the engraved plate by the

deposited sheet of copper while the superfluous deposit is being reduced. The time occupied in performing the operation is not of much consequence, compared with the importance of keeping the plate undamaged, but in the trials already made, it was found that the time required was really less than would have been occupied by 'knocking up,' and afterwards having to restore damaged work, and as the operation can go on during the night very little working time need be lost. The expense is a mere trifle, and the manipulations are so simple, that any European or native engraver could easily learn them.

I cannot of course claim any originality in the process beyond the modifications made in the European methods, but as it does not appear to be practised in England, I venture to bring it to the notice of the Society especially on account of the valuable aid it is likely to render in the production of the engraved sheets of the Atlas of India now rapidly progressing under the personal superintendence of the Surveyor General, and the possibility of its useful application to other purposes in the arts.

Colonel Thuillier said he thought the subject Captain Waterhouse had brought before the meeting was one of much interest and importance; not only in a professional sense as regarded his own department, but also in the interests of the Society and scientific objects generally. Colonel Thuillier could vouch for the very great importance of this mode of dealing with valuable copper plates, and the improvement it afforded on the old system. Captain Waterhouse had worked it out in a very practical manner and he was therefore entitled to the thanks of the meeting for his useful and interesting paper.

3. *New Burmese Plants*, Part II.—By S. KURZ, Esq.

This paper is a continuation of the author's former paper and will be published in the Journal, Part II.

4. *Identification of certain tribes mentioned in the Purānas with those noticed in Col. E. T. Dalton's Ethnology of Bengal.*—By BA'BU RANGALA'L BANERJI, Deputy Magistrate, Cuttack.

Little has hitherto been done to identify the various aboriginal races casually noticed in ancient Sanskrit literature. The notes on the subject appended to Professor Wilson's translation of the *Vishnu Purāṇa*, valuable as they are, as embodying the opinions of a thorough scholar and a man of vast experience, are nevertheless brief, obscure and often unsatisfactory, particularly regarding those races whose representatives are now no longer extant, or are few, insignificant or widely scattered. Particular races, such as the Coles, the Bheels and the Khonds, have been described at greater length in many essays and reports; but in their cases attention has been confined to

what they now are, and nothing, or next to nothing, has been done to unravel their ancient history. The Nágas have been more fortunate; they have had a great number of historians, and a great deal has been already written about their antiquity; but even as regards them, much yet remains to be known of what and who they were. The little knowledge hitherto possessed by European scholars regarding the autochthones of India have been a serious impediment in the way of a successful study of this branch of Indian archaeology. Few knew the names of the ancient races, and fewer still of the modern ones with whom they could compare them. This difficulty has, however, now been in a great measure removed. The publication of Col. Dalton's magnificent work on the Ethnology of Bengal has placed in the hands of the public a large mass of information on the subject of the most authentic kind, and the way to identification on the part of those who are familiar with Sanskrit literature, is clear. The learned author has not himself attempted much in the way of identifying the races he has described with those named in Sanskrit works, but his book affords valuable help in the prosecution of the task; and I have availed myself of it in compiling the following rough notes regarding the antiquity of some of the races noticed by him. My object is to bring together all the salient points regarding the different races from Sanskrit works, and to render them easily accessible to European scholars as helps towards further research.

No. 1.

The first race I have to notice are the Kirátas, otherwise called Kirátis and Kirántis.

Manu classifies the Kirátas under the head of Mlechchhas in Chapter X, where he reckons them along with the Paṇḍras, Oḍras, Dravidas, Kámbojas, Yavanas, Paradas, Chinas and the Palnavas.

All these tribes have been identified: the Paṇḍras or Paṇḍrakas were the people of Western Bengal. Professor Wilson enumerates the following districts of Bengal and Behar to have comprised the ancient Pundra, viz.:—Rájsháhi, Dinájpur, Rangpur, Nadiya, Birbhum, Burdwan, Midnapur, Jangal Maháls, Rámgarh, Páchete, Palamow and part of Chunar. The word Pundra signifies sugarcane of a particular species, called Puñri Akh in Bengali, so that Pundra evidently means the country of sugarcane. It may be remarked here, that the other name of Bengal, Gauḍa, is derived from *guda*, or molasses; Gauḍa consequently means the land of molasses. The two names of the country thus have a meaning almost analogous in purport. The quotation from Manu proves beyond a doubt that Bengal and Behar were reckoned as Mlechchha Des'a, or unholy land, in the days of the great Hindu lawgiver; and there was then no distinction of caste in those countries, for Bharata, the sage, defines Mlechchha Desa as the country where the four castes do not dwell.

चातुर्वर्ण्यव्यवस्थानं यस्मिन् देशे न विद्यते ।

खेच्छदेशः स विज्ञेय आर्यावर्तस्ततः परं ॥

The Odras are the Uriyās, not of course the Brahmins, Karans and other Aryan castes which have settled in Orissa, but an aboriginal tribe whose representatives are found in the Or Chasas of that province.

The Draviḍas are identified with "the people of the Coromandel Coast from Madras southwards, those by whom the Tamil language is spoken," they are in fact still called Draviḍas by all orthodox Hindus.

Wilford regards the Kāmbojas as the people of Arachosia. Arrian speaks of a country called Cambistholi; as the last two syllables of the word represent the Sanskrit, *sthala* (place), it evidently means the land of Kāmboja, (vide note, Wilson's *Vishṇu Purāṇa*, page 182. Vol. 2). The Kāmboja country was famous for its horses.

The term Yavana is now generally accepted as meaning the Greeks. The Prākṛita Yona is another form of Ion, by which name the Greeks were known throughout Western Asia—but a difference of opinion on the subject exists in some quarters.

The Sakas are the Sakai and Sacæ of classical writers, the Indo-Scythian of Ptolemy. They "extended about the commencement of the Christian Æra along the west of India from the Hindu Koh to the mouth of the Indus."

The Paradas were probably the Parthians—the Palnavas, or Palhavas according to some readings, were people of the country lying between India and Persia, the modern word Pahlavi, the language of Afghanistan, retains a trace of Palhava.

The Chinas were the people of China or Chinese Tartary according to some authorities.

The Daradas are the modern Durds—they are still living in the very same country where Manu found them: their country lies along the course of the Indus, above the Himalayas, just before it descends to India.

The Khasas are the Khásyas of North-East Bengal.

It is a noticeable fact, that these twelve tribes of Mlechchhas mentioned by Manu, all belong to the North of India and the North-West frontier, excepting the Odhra and the Dravidas; this shews that the aboriginal Kols, Bheels, Gonds, &c., were unknown or very little known in Manu's time: the last were reckoned more as giants and monsters (Rākshasas) than men.

But to return to the Kirátas. They have been noticed in Book II, Chapter III, of the *Vishṇu Purāṇa*, as a people living on the east of Bhārata or India, they were known to the Greeks as the Ceriadæ. These foresters and mountaineers are still living in the mountains east of Hindustan, and are still called Kirátis or Kirántis.

The bard of Sipurá, Kálidása, notices the Kirátas in his famous poem,

Kumára Sambhava or the Birth of the War-god, when describing the Lord of mountains, Himalaya.*

Although the Kirátas were classed by our poets and sages among the *Mlecchhas* or barbarians, still it is clear that they were not hated or shunned by the Aryan conquerors, like the other aboriginal tribes of India. The great hero of the Mahābhārata, Arjuna, adopted the name, nationality, and guise of a Kirāta for a certain period, to learn archery, and the use of other arms from Ś'iva, who was considered as the deity of the Kirátas. This episode of the Mahābhārata was taken up by the poet Bhāravi, who describes it in detail in his celebrated poem Kirātārjuniya.

Again, both the Himalaya-born goddesses Umā and Gangā have the nicknames of Kirāti applied to them by our lexicographers; and it is a question therefore whether these goddesses were the daughters of some Kirāta chieftain of the Himalaya, married to Ś'iva, a Hindu divinity, affording an example of miscegenation among the two races effected at a very early period of History; or whether Ś'iva was himself a Mongolian. His residence in the far Kylāsa, his braided hair, his oblique eyes, his great proclivity for smoking, his reputed authorship of the Tantrika, nasal, monosyllabic Mantras, go far to prove him to be a Mongolian rather than of an Aryan type. I have shown that the modern Kirānti or Kirātis are the Kirátas of Ancient India; this can be also proved geographically and ethnologically—we find them occupying the same country as described in the Purāṇas, and their physical traits and manner of livelihood agree.

The Kirátas, though now turned into cultivators and eaters of rice, were flesh-eaters in Ancient India, like their brethren living on the other side of the Himalayas; in fact, their chief occupation was nothing else but the chase.

It is remarkable that the medicinal Chirretta is a corruption of Kirāta, which is the Sanskrit name for this drug. The only other synonyms in Sanskrit are *Bhunimba*, *Anāryya-tikta* and *Kandalitikta*, the first means that it is the *nim* or *azadirachta* of the earth; the second implies the bitter of the non-Aryans; and the third signifies that which contains bitter in its trunk. The second name is very suggestive. It is a well known fact that the Chirretta grows in the lower ranges of the Himalaya, the country of the modern Kirāntis or Kirātis.

In the topographical lists of the Mahabharata, Bhishma Parva, separate

• भागीरथी निर्भरशीकराणां
बोद्धा मुञ्जः काम्यत देवदारुः ।
यदायुस्त्विष्टसृग्नेः किराते-
रासञ्चते भिन्नमिश्रिष्टवर्चे ॥ Chapter I, Verse 15.

mention of the Kirátas occurs more than once ; this leads me to infer that the aborigines now known under that appellation must have separated themselves and formed different clans before the great epic was composed. The Rājmalā, which gives an analysis of the royal family of Tipperah, states that the ancient name of Tripurā was Kirāta. According to Major Fisher the people of Tripurā are of the same origin with the Kácháris, but Colonel Dalton places the Kácháris in the same group with the Kirántis—the latter are placed under the head of “Northern borderers,” and the former under “Population of the Assam valley.” The dispersion of a race of hunters like the Kirátas was natural, and it was helped to a large extent by the Aryan settlers pushing them on further and further as they spread, and that will account for the wide range they now occupy.

No. 2.

Hayásyas, Haioos or Hayas. The horse-faced race.

Dr. Campbell gives a tradition that the Hayas originally “came from Lanká, having left that country after the defeat of their king Rávana by Rámachandra ; but the Raksha king Rávana is still their hero and god, and they have no other. They say that they remained a long time in the Deccan, whence they journeyed on to Semrounghar, in the days of its glory, and that lastly, but a long time ago, reached the hills, their present abode.” Now the Kinnaras, or heavenly choristers, were described by the poets of India as living in the Himalaya under Kuvera, the Indian Plutus, and they were elept Hayásyas or horse-faced, an epithet which is well accounted for when we read the physical traits of the modern Haioos or Hyas in Hodgson. The tradition of their being the kinsmen of Rávana is explained by the fact that in the Ramayana, Kuvera, the lord of the Hyásyas, is styled the step-brother of Rávana. Again, the Hyásyas were designated Kinnaras, which means, men of ugly features. Mr. Hodgson’s description certifies the deformity of this people very plainly and pointedly, as will be seen in the following extract : “The physiognomy of this tribe is rather of the Mongolian cast, the bridge of the nose is not perceptibly raised, the cheek bones are flattened and very high, the forehead narrow.” This description may be applied generally to all the offshoots of the Mongolian race inhabiting the sub-Himalayas. The profile and full face sketches given by Hodgson at page 78, Vol. XVII, Part 1 of the Journal of the Society, fully justify the Indo-Aryan writers in designating the race with the epithet *Turanga-vadanas* or horse-faced.

Mr. Hodgson defines the Kiránt country thus :—

- | | |
|----------------------|-------------|
| 1. Sunkosi to Likhu. | } Khombuan. |
| 2. Likhu to Arun. | |
| 3. Arun to Meehi. | } Limbuan. |
| 4. Singilela ridge. | |

He observes that the Khombuan and the Limbuan are, at all events, closely allied races; and according to Dr. Campbell, in the generic term Limbu, are included the Kirántis, the Eakas (Hodgson Yukhas), *i. e.* Yakshas, and Kais. That the Kirátas and Yakshas herded together or occupied the same region of Himalayas in Ancient India may be gathered from the following extract from Kálidása :

जितसिंहमया नागा यवाश्च बिलसोनयः ।

यथाः किम्पुरुषाः पौरा योपितो वनदेवताः ॥

The Kimpurushas were the Kinnaras, *i. e.* the Hayásyas, *i. e.* the modern Hiaoos. That they originally migrated from Mongolia may be deduced from the fact of Hindu geographers placing the Kimpurusha varsha, or the country of the Kimpurushas, between the Himalaya and Hemakuta or Altai mountains.*

No. 3.

Yakshas = Eakas or Yakhas.

These people are thus described in the Purápas. "The Yakshas are the servants of Kuvera, moving in pairs, with storax and stones in their hands, dark as collyrium, their faces deformed, eyes a dull brown, their statures enormous: they are dressed in crimson robes and crystal beads. Some of them are of high shoulder-bones." This description, however, is totally contradicted by Kalidása, who describes the wife of his exiled Yaksha, in the following glowing lines :

"There, in the fane, a beauteous creature stands,
The first best work of the Creator's hand ;
Whose slender limbs inadequately bear
A full-orbed bosom, and a weight of care ;
Whose teeth like pearls, whose lips like Bimbas show,
And fawn-like eyes still tremble as they glow."

(Wilson's translation).

The contradiction, however, may be easily accounted for when we call to mind the difference between the matter-of-fact description of the Purápas with that of the great poet of Ujjayini, replete with elevated fancy and imagination. The Purápic description agrees best with modern ethnology.

The ancients knew well that the country of the Yakshas was the land of the pine and turpentine. The Sanskrit for *Pinus longifolia* and turpentine is *Yaksha Dhupa*, or incense of the Yakshas. This "is a native of the Himalayas, at elevations of 5 to 600 feet, and also found in the Kherree Pass, the entrance to Nepal. The wood is light, and being full of resinous matter, like the *Pinus Deodara*, both are frequently employed in the hills for making torches, as pieces of other species often are in other parts of the world. A

* जम्बूद्वीपस्य नवखण्डान्तर्गतं हिमाचलसहस्रकुटयोर्मध्यवर्तिवर्षम् ।

very fine turpentine is obtained as an exudation from incisions made on the trunk." The tree is sometimes called *Sarala*, or straight, on account, no doubt, of its erect shape. It is thus noticed by Kālidāsa:

"Hark! the gales whistling through the woods of pine,
 Urging to madness all the straining boughs
 That twist and chafe and bend and intertwine,
 The latent flame to wildest fury rouse,
 Singeing the long hair of the mountain cows.
 Quick! rain a thousand torrents on the crest
 Of the kind hill and cool his burning brows:
 With wealth of water thou art richly blest,
 And fortune's sweetest fruit is aiding friends distress.

V. 55. *Griffith's translation of the Meghaduta.*

A very aromatic unguent was said to have been much used by the ancient Yakshas called *Yaksha Kardama* or Cerate of the Yakshas, composed of camphor, agallocham, musk and kakkola (*Myrica sapida*?) All these ingredients, excepting agallocham, are productions of the sub-Himalayan range. In the *Meghaduta*, the following verses shew that the Yakshas were in the habit of burning incense or aromatic powders in their bedrooms.

"Here filled with modest fears, the Yaksha's bride
 Her charms from passion's eagerness would hide;
 The bold presumption of her lover's hands
 To cast aside the loosened vest, withstands;
 And, feeble to resist, bewildered, turns
 Where the rich lamp with lofty radiance burns;
 And vainly whelms it with a fragrant cloud
 Of scented dust, in hope the light to shroud."

Wilson's translation of the Meghaduta.

The following extract again shews that the Yakshas must have been great experts in architecture and the art of painting:—

"And she* has charms which thought but there extols;
 High as thyself her airy turrets soar,
 And from her gilded palaces there swells
 The voice of drums, loud as thy thunder's roar;
 Thy pearls are mockt by many a jewelled floor,
 Come, with the glories of thy bow compare
 The varied tints on arch and corridor:
 And, for thy lightning in the midnight air,
 Look in her maiden's eyes and own a rival there."

Griffith's translation of the Meghaduta.

* Alaka, the city of the Yakshas.

We have no description of the houses of the modern Yakshas, but we have that of the houses of a cognate tribe, the Bhutias, which shews that "in the construction of their houses, they are rather in advance of their neighbours of the plains. They are compared to small farm-houses in England and to Swiss cottages, built generally of rubble-stone and clay of two, three, and sometimes of four stories: all the floors are neatly boarded with deal, and on two sides are well constructed verandas ornamented with carved and painted woodwork. One of these is sometimes enclosed for the women, the front opening by sliding panels when they wish to peep. The workmanship displays considerable skill in joining, the panelling being very good of its kind." The description in Sanskrit quoted above was that of a Prāsāda, a temple according to the commentator. Compare the above description with that of a modern temple visited by the writer in 1849:—

"It is a square building with gable ends and a thatched projecting roof under the gable, facing the north; there is a projecting balcony in front of a large bay window which lights a recess at the opposite end of the temple containing three large Buddhist images, all seated in the usual cross-legged attitude of absorbed contemplation. They appeared to be formed of clay, and were exceedingly well executed and resplendent with gilding. The apartment, about 20 feet square, is boarded, and the walls are entirely covered with painting, of figures in similar penitential attitudes but differently dressed. * * * * The colours were particularly brilliant and well chosen, and the drawing tolerably correct to heighten the effect. A priest's house also of stone and two-storied, was near the temple; and with its projecting roof and balconies was a picturesque effect."

No. 4.

Bhillas=Bhils or Bheels.

The following is a description of a Bhilli or Bheel woman from the *Hyagriva-vadha Kāvya*.

"The Bhilla damsel, clad in leaves girt with a creeper, was reclining on the brow of a hill, whilst her husband was engaged in decorating her locks with hill-jessamines, culled by herself."*

This description puts one in mind of the Patuá or Juángá women so graphically described and illustrated by Col. Dalton. Very likely the Bhil women had not given up the verdant foliage for their dress, when the *Hyagriva-vadha* was composed; but a hypothesis may be started as to the origin of the Bhillas of Rajpútána and the Juángás of Keonjhar. It is a puzzle to ethnologists whether the Bhils and the Kols do not belong to the same aboriginal stock. Mr. Forbes Ashburner,

* जघनस्थलनदपववज्जिगिरिमञ्जिकुरुमानि कापि भिक्षी ।

अवचित्य गिरौ पुरो निपणा स्वचानुत्कुचयाश्चकार भर्ता ॥

the Rev. Mr. Dunlop Moore, Sir John Malcolm, Captain Probyn and other authorities are of opinion that the Kols or Kolis and the Bhils are not distinct races, and we know that the Juángás or Janguás are a subdivision of the Kolarian race, the conjecture therefore follows that the Kolarian race with all its branches was known to the Puránic writers under the generic name of Bhillas, for we have hitherto failed to find in the Purápas and the poetic literature of the middle ages any description or details of the Kols distinct from those of the Bhils. The Bramha Vaivarta Purána ascribes the origin of the Kols to a Tivara mother. Parasara and others say that the Bhillas were born of a Tivara father and a Bhráhmāni mother.*

The Bhils speak a sort of Hindi throughout their haunts in Rajpútána, and they are much more Hinduized in their habits and customs than most of the other aboriginal tribes of Southern India. Indeed, the elder Hindu writers classed them among the *Antyajās* or lowest castes of the Hindus. It has been already noticed that the great Parásara, the father of the still greater Vyása, ascribes their origin to a Brahmani mother and Tivara father; the Tivara is the modern Tiār of Northern India and Bengal, and the Tivaras according to the same authority were the offspring of a Churnaka woman by a Pundraka, both very low castes, the Churnakárs are the Chunaris or makers of Chunam; and these facts show that the Bhillas were considered from a very early period to be a cross between an Aryan and an aboriginal tribe. Later writers, particularly lexicographers, it is true, classed them among the mlechehhas, but neither Manu nor the other lawgivers have done so. Parásara appears to be a great tolerator of all the hated tribes, and this may be accounted for by the fact, that he himself begot Vyása by a Kaivarta woman called Matsyagandhá or she of fishy-smell. Her son, Vyása, of course, gives her a Kshatriya origin by a most unnatural myth, though he admits her to be the nursling of Dosa, the Kaivarta chief. Now these Kaivartas have been classed along with the Bhils in one of the law books of the Hindus.† So we have not only the Kaivartas but the Rajakas (washermen) and the Charmakárs (leather dressers) in this category. The Charmakárs are scarcely considered as Hindus. Sir George Campbell, speaking of them in his *Ethnology of India* says "They used to be sworn in a Court by a peculiar guru of their own, not by the ordinary name

* पुलिन्द मेद भिल्लास पुञ्जा सज्जय धावकः ।

कुन्दकारो डोखलो वा स्तपो हस्तिपक्षया ॥

एते वै तीवराज्जाताः कन्यायां ब्राह्मणस्य च ।

† रजकचर्मकारस्य नटो वरुड एव च ।

कैवर्ग मेद भिल्लास सभैते अन्यजाः स्मृताः ॥

इति प्राचयिचतत्त्वं ।

of God." But though the Chámárs are hated as outcastes and helots to this day, their congeners, the Kaivartas and Rajakas, are not—at least in Bengal. The late millionaire lady Rásmání Dási of Janbazar was a Kaivarta, and the first man of Calcutta, who interpreted the English merchants to the weavers of Sataloti, was a Rajaka, or washerman; his name was Káli or Kalan Sarkár, and one of the streets in the native part of the town still bears his name: he is said to have been the foremost native of influence in Calcutta during his time. The Kaivartas, the Rajakas, and the Chámárs have much improved in physique and complexion; in fact some of them are as fair as the fairest of Bráhmans, owing to their constant contact with the Indo-Aryans, but their old brother Bhilla still retains the same Ethiopian colour and diminutive stature which characterised him when Parásara found him in his jungle home thousands of years ago.

The modern Bhils do not appear to be so exclusive as other branches of the great Kolarian race. Sir George Campbell says: "It seems very strange that they should have no language of their own;" and we are given to understand by Col. Tod that the Oondru Bhil "still claim the privilege of performing the *teeka* on the inauguration of the descendants of Bappa," and that the Bhumia Bhil chief of Oguna Panora "is of mixed blood, from the Solanki Rajput, on the old stock of pure (Oogla) Bhils." It is a curious fact, that the autochthones of India preside prominently in the coronation of their Aryan conquerors to this day, in many places. The interesting scene witnessed by Colonel Dalton in Kaunjhar on the occasion of the late inauguration of young Dhananjaya Bhanga, is an instance of this misdirected loyalty; but this interchange of good offices and blending of two different races are the natural consequence of the promiscuous association we have had in India from the days when Ráma conquered Ceylon with his aboriginal cohorts to the days when Seringapatam and Assaye were surrendered.

In the later poems of the Hindus, we find that in the Sayambara or the ceremony of proud daughters of the solar and lunar royal races in the choosing of their husbands, even the outcaste Bhilla and other aboriginal chieftains were invited, and sat side by side with the flowers of Kshatriya chivalry and heroism.

In concluding this paper, I may notice *en passant* a curious mistake committed by Col. Tod where he translated "Vena Putra" as children of the forest. Vena Putra means the children of Vena, the notorious infidel king, in whose time intermarriages of the original four great castes were allowed, whence originated all the Antyajás who represent the lower orders of the Hindu community.

Mr. Phear said if the identifications were well founded, as to which an opinion could hardly be formed upon the short extract from the paper which had been read, they would be valuable contributions to ancient Hindu history. The interest, and at the same time the difficulty of questions such as those dealt with by the paper, might be illustrated by some curious facts. Col. Dalton in his *Ethnology of Bengal* remarks, that the dances of the Santal girls of the present day almost precisely correspond with the description given in the Vishnu Purána of the dances of the cow-girls in which Krishna formed the centre point, and he, Mr. Phear, would say from his own observation, that he thought it impossible for any one who witnessed the joyous light-hearted dances of the young people both Oráons and Kols on the Chutiá Nágpúr plateau not to be at once struck with their resemblance to the scenes of the Puranic traditions. And thus we seemed to have arrived at the noteworthy fact, that marked peculiarities of social manners and habits, which the Puráns depict as obtaining among supposed Aryans of the purest water, are now to be observed among non-Aryans; and it may be added are to be observed there exclusively, for it is hardly too much to say that the hilarious enjoyment of life, and the vivacious dances still to be seen on the outside of the Hindu populations, have become at this time, whatever was the case in the days of antiquity, foreign to the Hindus. It is also remarkable that perhaps the best illustration, which could be given of the system of internal state administration among the ancient Aryans, so far as it is disclosed to us by Manu, would be drawn from the actual administrative organization of the Kol, *i. e.* non-Aryan, community as it existed down to very recent times.

5. *Description of a Bachelor's Hall among the Mikir Tribes, Assam, with certain Symbols connected therewith.*—By C. BROWNLOW, Esq., Kachhár.

At a point on the Gúmrah river where it makes its exit from the north Kachhár range, or rather just where it leaves the higher ridges and comes out among low outlying hillocks on which stands the tea plantation of Kallinecherra, at this point and nearly opposite the Kallinecherra garden, is one of those old fortifications that occur at points all along the range.

It consists of an earthwork thrown up along the south face of the hill, and all along the top of the mound there are traces of ancient masonry-work now fallen to pieces or removed.

The bricks are large and squarish, not very thick, and well burnt.

On the mound stands an immense *Artocarpus* (Cham) tree, which must have taken root after the mound was formed and which is certainly not less and probably much more, than a hundred years old. The west side of the fortification is a steep natural scarp descending sheer down to the river, and on the east side is a ravine almost equally steep. The position is

admirably selected, and might, with a little repair, and a few additions, be made almost impregnable.

The interior of the entrenchment is at present occupied by a Mikir village consisting of 8 or 10 houses which are built on piles at a good height above the ground, each house having a bit of open platform in front on which the people sit in the evenings and sleep at nights. There is no palaver house as in Kachhári villages.

The Bachelors' Hall which it is the immediate object of this paper to describe, is situate on one side of the village, a little apart; it is well built and stands on piles like the the rest, and is matted with the wild bamboo turza, or matting made of the bamboo beaten at the joints until well split and then opened out, this is the matting used in all habitations of hill-men that are anywhere near the jungle and that are built on piles.

There is a front stage to the Hall which is reached by a wooden ladder consisting of a log with recesses cut for the foot.

On both sides of the stage there are live simúl trees (*Bombax heptaphyllum*) which have been put in live and have rooted, and on one of them was affixed a plant of that elegant parasite, the *Dendrobium bambusifolium*. At the entrance there are also several entire bamboos arranged, so as to allow any or all to be lifted up for anybody to pass and then let down again. At the opposite side of the house inside was the urinary, consisting of a small recess projecting a little way out from the building.

Of the figures in the plate, No. 1 is a stick peculiarly carved, which is charred and used for cleaning the teeth. (See Plate II).

No. 2 is a drum used for summoning the lads and unmarried men to sleep.

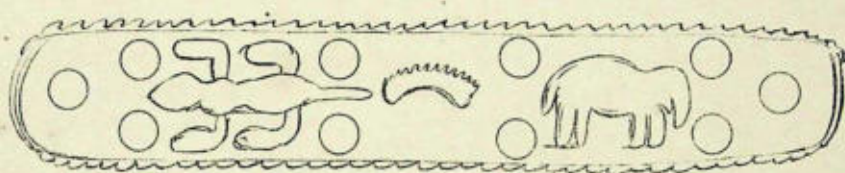
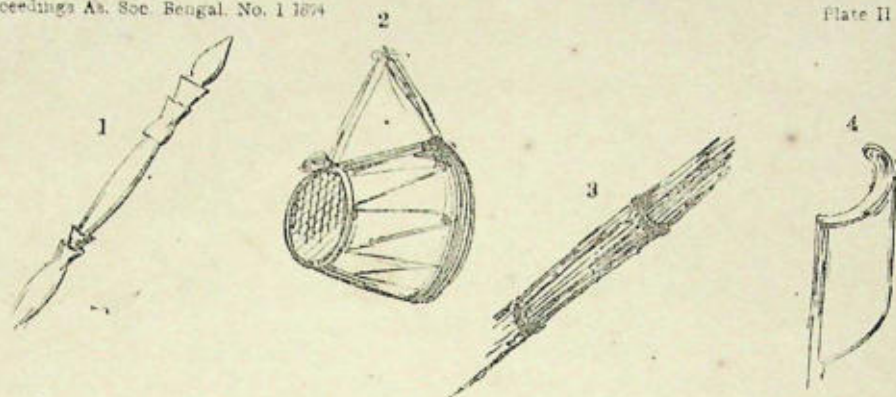
No. 3 is a bundle of sticks used in jhoom measurement.

No. 5 is a board fixed over the door which has carved on it certain emblematical figures, which were explained to me as—woman's breasts, *Che-hang* (an alligator?), *Ingnar* (elephant), *Chiklow* (moon). As these symbols may very possibly throw light on the affinities and origin of the tribe I think a notice of them may be of interest to your Society.

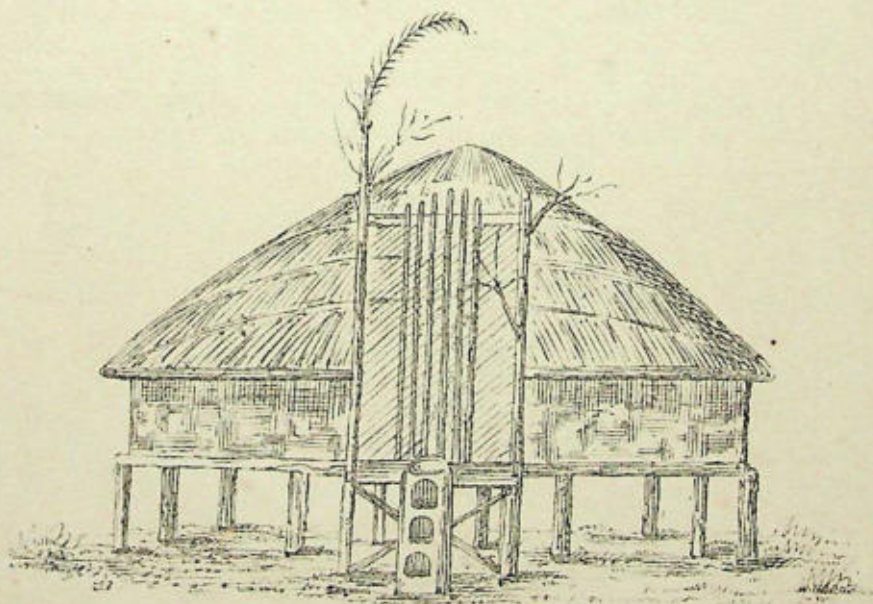
The Mikir numerals are as follows—

isi	heni	kathom	pheel	phongo	tharok	throksi	nerkep	serkep
1	2	3	4	5	6	7	8	9
kep	kray	so	kray hni					
10	11		12					

Mr. Phear observed that Mr. Wallace in his Malay Archipelago mentioned the institution of Bachelors' Halls among the Dyaks of Borneo; and he said that the same thing still existed in one or two Oráon villages in the neighbourhood of Ránci.



5



6

- 1 Stick for cleaning teeth, end charred.
- 2 Drum for summoning Young Men to the Hall.
- 3 Bundle of Sticks for Surveying Jhooms.
- 4 Urinary.
- 5 Board over door representing Chehang (Alligator), Ingbar (Elephant), Chaklow (Moon), and Woman's breasts.
- 6 Bachelor's Hall.

other; and, the only apparent difficulty is as regards the wide stream between Fattapoer and Sjatrapoer, shown in Van den Broucke's map, while Fathpúr and Játrápúr are both on the same side of the river. But my knowledge of the locality, and acquaintance with its traditions, enable me to state positively, that the waters of some of the northern rivers of Jessore did not formerly meet opposite the sub-division of Khulná, and flow down the Rupsáhá* (Roopsa), but some distance to the eastward, through the Jogikháli and Gopí Nadi† (the former is fast silting up, and the latter is entirely closed) into the Pasar (Pussur). Besides, we have the dry bed of a river, called by the natives *Márá Gang*, or "dead river," which apparently ran between Fathpúr, and discharged itself into either the Gopí Nadi or Jogikháli, and thus communicated with the Pasar.

From Van den Broucke's map, it would appear that the Ganges probably near the existing station of Kustiýá (Koosteah) divided into two branches; one running in a south-westerly direction down the Jabuná under Jessor-Iswaripur, and the other in a south-easterly direction down the river under Játrápúr, the name of which river I cannot trace. That the Ganges has changed its course considerably, is generally known, and on this head the remarks of Dr. Oldham, an acknowledged authority on the subject, may be aptly quoted: "It is also certain in this peculiar delta, the general course of the main waters of the Ganges has gradually tracked from the west to the east, until of late years the larger body of the waters of the Ganges have united with those of the Brahmaputra and, have together proceeded to the sea as the Megná." *Vide Proc. As. Soc.*, Feb. 1870.

On the whole, I venture to think, that we may reasonably conclude the identity of Sjatrapoer with Játrápúr, and Fattapoer with Fathpúr, to be almost, if not quite, established. And if it be so, then Van den Broucke's map is utterly wrong in placing Noldy to the S. E. of those two places, instead of in a diametrically opposite direction, *viz.* N. W., *provided* it was meant for "the town and mahall of Noldi (Naldi) on the Noboganga," as surmised by Mr. Blochmann, (p. 231.) At any rate, I confidently submit, Jessor is meant for Jessor-Iswaripur, and such being the case, Noldy would not exactly be to the south-east of Jessore, but to the north-east thereof.

The receipt of the following communication was announced—

1. Annals of 'Omán, translated from the *Kashf-ul-Ghummah* by Col. E. C. Ross, Political Agent at Muscat.

* This was originally a mere *khál*, or small creek, excavated by one Rúp Sáhá, a Salt Merchant (from whom it derives its name) towards the close of the last century, to connect the Bhairab and Pasar rivers, and thus facilitate the progress of boats laden with salt proceeding down to Calcutta. It is now a wide and turbulent river, but the ferry *ghát* at Khulná is still known as Rúp-Kháf-Ghát. H. J. R.

† Neither of these are shown in the Survey Map. H. J. R.

LIBRARY.

The following additions have been made to the Library since the meeting held in December last.

Presentations.

* * * Names of Donors in Capitals.

Proceedings of the Royal Society, Vol. XXI, No. 146.

G. W. Royston-Pigott.—Researches in Circular Solar Spectra, applied to test Residuary Aberration in Microscopes and Telescopes.

The Quarterly Journal of the Geological Society, August, 1873.

Mr. Schindler.—On the Geology of Kazirun, Persia. *P. M. Duncan*.—On the genus *Palaeocoryne* (Duncan and Jenkins) and its affinities.

THE GEOLOGICAL SOCIETY OF LONDON.

Journal of the Statistical Society, Vol. XXXVI, Part II, Secs. 1 and 2.
Part III.

Part II. Sec. 1. *E. B. Martin*.—Notes on the Purchase of the Railways by the State.

Part III. The Progress of Indian Finance.

THE STATISTICAL SOCIETY OF LONDON.

Journal of the East Indian Association, Vol. VII, No. 2.

The Land Question in India.

THE EAST INDIA ASSOCIATION, LONDON.

Journal Asiatique Nos. 4, 5, 1873.

No. 41. *M. F. Fagnan*.—Observations sur les Coudées du Mekyas. *M. Halévy*.—Etudes Sabéennes, examen critique et philologique des inscriptions sabéennes connues jusqu'à ce jour. *M. Belin*.—Bibliographie Ottomane, ou Notice des livres Turcs imprimés à Constantinople durant les années 1288 et 1589 de l'hégire. *M. Barbier de Meynard*.—Bibliotheca Geographorum Arabicorum.

THE ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, Septembre, Octobre, 1873.

Septembre. *J. Halévy*.—Voyage au Nedjran. *Dr. Martin*.—Pékin : sa météorologie, son édilité, sa population.

Octobre. *C. Grad*.—Résultats scientifiques des explorations de l'Océan glacial à l'est de Spitzbergen ; en 1871.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Zeitschrift der Deutschen Morgenländischen Gesellschaft, Band XXVII, Heft III.

H. von Maltzan.—Dialectische Studien über das Mehri im Vergleich mit verwandten Mundarten. *Dr. O. Blau*.—Altarabische Sprachstudien. II. *Dr. H. F. Mögling*.—Jaimini Bhārata, 2 Kapitel, aus dem Kanaresischen umschrieben, übersetzt und erläutert. *E. Schrader*.—Die Abstammung der Chaldäer und die Ursitze der Semiten. *J. Grill*.—Über das Verhältniss der Indogermanischen und der Semitischen Sprachwurzeln.

THE GERMAN ORIENTAL SOCIETY, LEIPZIG.

Monatsbericht der Königlich-Preussischen Akademie der Wissenschaften zu Berlin, Juni, Juli, August, 1873.

Juni. *Peters*—Über einige zu der Gattung *Cynonycteris* gehörige Arten der Flederhunde und über *Megaderma cor*.

Juli. Aug. *Jacobi*—Beitrag zur Zeitbestimmung Kalidása's.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

The Christian Spectator, January 1874.

THE EDITOR.

On the Nature and probable Origin of the Superficial Deposits in the Valleys and Deserts of Central Persia, by W. T. Blanford, F. G. S.

THE AUTHOR.

The Indian Antiquary, December, 1873.

Major J. W. Watson—Legend of the Ráni Tunk. *Rev. C. E. Kennet*—Notes on the Saiva-siddhānta. *Rev. F. J. Leeper*—The Naladiyar. *A. C. Burnell*—On the Colossal Jain Statue at Karkala. *J. Burgess*—Papers on Satrunjaya and the Jains. *G. H. Damant*—Legends from Dinājpūr. *H. H. Rama Varma*—Inscriptions in the Pagodas of Tirkurangudi in Tinneveli and of Suchindram in South Travancore.

THE GOVERNMENT OF INDIA.

Report on the Financial Results of the Excise Administration in the Lower Provinces for 1872-73.

THE GOVERNMENT OF BENGAL.

Report of the Land Revenue Settlement of the Lucknow District, by Mr. H. H. Butts, Offg. Settlement Officer.

Report upon the Revenue Administration in the Province of Oudh for 1872.

Fyzabad Settlement Reports Nos. 2 and 3, 1865, by P. Carnegy.

Historical Sketch of Fyzabad Tehsil, including the former Capitals, Ajudhia and Fyzabad, by P. Carnegy, (Illustrated with Photographs).

Selections from Records,—Groves.—Indebtedness of Cultivators.—Sardah Canal.

Annual Report upon the Administration of the Province of Oudh for 1871-72 and 1872-73.

THE CHIEF COMMISSIONER OF OUDH.

Report on the Sanitary Administration of the Panjáb for 1872.

THE GOVERNMENT OF THE PANJAB.

Annual Report of the Sanitary Commissioner with the Government of India for 1872.

THE SANITARY COMMISSIONER.

Report on the Administration of the Central Provinces for 1872-73.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Reports on the Administration of Mysore for 1866-67 to 1871-72.
6 Vols.

THE CHIEF COMMISSIONER OF MYSORE.

Purchase.

Comptes Rendus, Vol. 77 Nos. 5-13.

No. 8. *M. P. Bert*—Recherches expérimentales sur l'influence que les changements dans la pression barométrique exercent sur les phénomènes de la vie.

No. 10. *M. Tacchini*—Nouvelles observations relatives à la présence du Magnésium sur le bord du Soleil, et réponse à quelques points de la théorie émise par M. Faye.

No. 11. *M. Ch. Pellaria*—Les déjections cholériques, agent de transmission du Choléra.

No. 12. *M. P. A. Favre*—Recherches thermiques sur la condensation des gaz par les corps solides (suite): Absorption de l'hydrogène par le noir de platine. *M. P. Truchot*—Sur la proportion d'acide carbonique existant dans l'air atmosphérique. Variation de cette proportion avec l'altitude.

No. 13. *MM. E. Mathieu et V. Urbain*—Du rôle des gaz dans la coagulation de l'albumine. *M. Déclat*—Sur un nouveau traitement du choléra et probablement de la fièvre jaune par l'acide phénique et le phénate d'ammoniaque au moyen des injections sous-cutanées.

Journal des Savants, Septembre, 1873.

Revue Archéologique, Septembre, 1873.

Revue et Magasin de Zoologie, No. 9, 1873.

(Review.) *The Thanatophidia of India*—Description des serpents venimeux de la péninsule indienne, par M. J. Fayrer.

Revue des Deux Mondes, Vol. CVI. No. 4, Vol. CVII. Nos. 1, 2, 3.

1st Sept. *M. C. Lécuyer*—Le sens du Beau chez les Bêtes—Le Darwinisme. Psychologique et la Psychologie comparée.

The L. E. and Dublin Philosophical Magazine, September, and October, 1873.

September. *E. Edlund*—An enquiry into the nature of Galvanic Resistance, together with a Theoretic Deduction of Ohm's Law and the Formula for the Heat developed by a Galvanic Current. *G. B. Airy*—Experiments on the Directive power of large Steel Magnets, of bars of Magnetized Soft Iron and of Galvanic Coils in their action on External small Magnets. *Lord Rayleigh*—On the Nodal lines of a Square Plate. *A. Barthélemy*—On the Passage of Gases through Colloid Membranes of Vegetable Origin. *M. M. Champion and Pellet*—On Explosions produced by High Tone.

October. *A. Tribe*—Specific-gravity Bottle for Liquids spontaneously Inflammable in contact with Air.

The Annals and Magazine of Natural History, September, and October, 1873.

September. *H. W. Bates*—On the Longicorn *Coleoptera* of Japan. *Dr. A. Günther*.—Report on a collection of Fishes from China. *Dr. J. E. Gray*—On the Black and Ashy Grey Double-horned Asiatic Rhinoceroses. *M. L. Cienkowski*—On *Noctiluca miliaris*, Sur. *Dr. J. E. Gray*—Sponges from Ceylon. *Profr. T. Thorell*—Necessity of a Common Language in Natural Science.

October. *H. W. Bates*—On the Longicorn *Coleoptera* of Japan. *Dr. J. E. Gray*—Additional Notes on the Form of the Bones in the Sternum of very young Tortoises and their Development. *Dr. C. F. Lütken*—On Spontaneous Division in the *Echinodermata* and other *Radiata*. *J. Wood-Mason*—On *Rhopalorhynchus Krüyeri*, a new genus and

species of *Pycnogonida*. *J. Wood-Mason*—Note on certain species of Phasmidae hitherto referred to the genus *Bacillus*.

The Quarterly Journal of Science, No. XL. October, 1873.

H. C. Sorby.—On Comparative Vegetable Chromatology.

The American Journal of Science, August, and September, 1873.

August. *A. M. Mayer*—On the effects of Magnetization in changing the Dimensions of Iron and Steel bars, and in increasing the Interior Capacity of Hollow Iron Cylinders. *J. D. Dana*—On some results of the Earth's Contraction from cooling. Part IV, Igneous Ejections, Volcanoes.

September. *J. D. Dana*—On some results of the Earth's Contraction from cooling; Part V., Formation of the Continental Plateaus and Oceanic Depressions. *E. W. Morley*—Apparatus for rapid filtration.—Birds with Teeth.—Petroleum of Upper Burmah.—India-rubber or Caoutchouc of Upper Burmah.

The Westminster Review, October, 1873.

Pratna karma Nandini, Vol. VI, No. 8.

Harold's Coleopterologische Hefte, IX-X.

Monographie der Gattung *Tror*.—Literatur.

Exchange.

Nature Nos. 110-114.

The Athenæum. August and September, 1873.

Ocean Highways, Vol. 1, Nos. 1-9, April to Dec., 1873.

No. 1. The Caspian and the Region to the Eastward. *Dr. F. P. Smith*.—The great Rivers of China.

No. 2. *C. E. Austin*—Railway communication between London and Calcutta. *Prof. A. Vambéry*.—The Steppes to the North of Bokhara. The Naga Hills. (Surveying work of Major H. H. Godwin-Austen).

No. 3. *Captain A. D. Taylor*—The Harbours of India.

No. 4. *Reed. G. P. Badger*—Khiva or Khuwarizm.

No. 5. *Col. H. Yule*—On Northern Sumatra and especially Achin. *Revd. G. P. Badger*—The Oxus. *Commander A. D. Taylor*.—Indian Harbours; 11. *R. Michell*. Travels of M. Fedchenko in Kokand.

No. 6. *Revd. G. P. Badger*—Transoxiana.

No. 7. Narrative of a visit to the Kuh-i-Khwajah in Sistan. *A. W. Dilke*.—A visit to Kuldja.

No. 8. *Baron F. von Richthofen*—Distribution of Coal in China.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR FEBRUARY, 1874.

The Annual Meeting of the Society was held on Wednesday, the 4th February, 1874 at 9 o'clock, P. M.

Col. H. Hyde, R. E., President, in the chair.

According to the Bye-laws of the Society, the President ordered voting papers to be distributed for the election of Officers and Members of Council for 1874, and appointed Messrs. Waldie and Peterson, scrutineers.

The President then called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1873.

In submitting their Annual Report on the state of the Society's affairs during 1873, the Council have to congratulate the Society on its unusually flourishing condition, shown not only by the improved state of its funds, but also by the increase in the number of members and the extension of its sphere of usefulness.

The improvement in the state of the funds of the Society is owing to the fact of the Government of India having recognised the claims of the Society to an allowance as House-rent, pending the completion of the New Museum, and granted them the sum of Rs. 400 monthly on this account with effect from 23rd March, 1871, the date fixed by the Indian Museum Act for the completion of the New Museum Building. The sum in arrears, thus placed at the Society's disposal, has enabled the Council to clear off all liabilities, to carry out repairs of the Society's property most urgently called for, and yet leave a considerable balance which has been funded.

The number of elections during the year under review has been 44, including one life member, against 25 of the previous year, and exceeding the average of the last five years by 2.

During the last 12 months, the Society has lost 18 ordinary members by withdrawal, 2 by cancelling and 6 by death, in all 26, leaving a net increase of 18 ordinary members.

At the commencement of 1873, there were 438 ordinary members on the list, but in accordance with the provisions of rule 14 b, the names of 98 who had been absent from India upwards of 3 years and were not likely to return, have been struck off, so that there will now be a total of 340 + 18, or 358 ordinary members on the list.

Of these 358 members, 62 are absent from India, of whom six are subscribing members and three are life members, thus making a total of 302 paying members, of whom 116 are resident and 186 non-resident. The names of 23 of the latter have to be removed to the absentee list under rule 14 b.

The table below shows the fluctuations of members during the last 10 years, but it must be remembered that the diminution this year is only apparent, being caused by the striking off of absentees who could not be considered in any way as members of the Society.

Year.	Paying.		Absent.	Total.	
	Resident.	Non-Resident.	Non-Paying.		
1864	228	(133,	195)	92	320
1865	267	(136,	131)	109	376
1866	293	(124,	169)	94	387
1867	307	(154,	153)	109	416
1868	294	(159,	135)	133	427
1869	304	(162,	142)	138	442
1870	266	(134,	132)	148	414
1871	286	(112,	174)	160	446
1872	277	(105,	172)	2 L.M. 159	438
1873	302	(116,	186)	3 L.M. 53	358

Among those who have been lost to the Society by death, the Council have to record with much regret the names of Dr. J. P. Colles, V. Irwin, Esq. late of the Bengal Civil Service and Lieut. J. H. Bourne late of Shillong, Messrs. N. T. Davey of the Revenue Survey, W. McLaren Smith of the Presidency College and Dr. J. L. Stewart.*

The elections of C. P. Bird, Esq., C. S. and Col. H. Drummond have been cancelled at their own request.

Museum.

The Council continue to carry out the provisions of Act XVII. of 1866 and transfer all Natural History and Archaeological donations received by them to the Trustees of the Indian Museum.

The Trustees on the part of the Society were Mr. W. S. Atkinson, Mr. H. F. Blanford, Col. H. Hyde, R. E., who succeeded Dr. T. Oldham as President of the Society, and Col. J. E. Gastrell, who was permanently

* Since the report was submitted the Council have received with great regret intelligence of the demise of Mr. E. Blyth, an Honorary Member of the Society.

appointed on the departure of Dr. F. Stoliczka to accompany the Yarkand Mission.

Finance.

The Council have great pleasure in reporting that the Financial position of the Society is in a more satisfactory state than it has been for some years past.

As already mentioned, this is principally owing to the fact that the Government have granted the Society an allowance of Rs. 400 per mensem from 23rd March, 1871, the date fixed by Act XVII. of 1866 for the completion of the New Museum building till such time as it shall be ready for the accommodation of the collections of the Indian Museum. This allowance has been regularly drawn since April last, and the sum of Rs. 9,316-2-1 the amount of arrears accruing to the Society from 23rd March, 1871, has been realised and Rs. 5,700 of it funded.

This increase in the income of the Society has enabled the Council to sanction larger expenditure on account of the Journal and Library than was allotted in the Budget Estimate at the beginning of the year. They have also been able to meet many urgent requirements for the benefit of the Society. Thus the exterior of the Society's premises has been repaired at an expense of Rs. 3,500, and Rs. 1,075 has been granted for cleaning and repairing some of the most valuable portraits and pictures in the Society's collection, which required immediate care. Also extra expenditure on account of Journal, Rs. 4220 was sanctioned.

The amount realisable from the paying members now on the rolls (116 residents and 180 non-residents at the rates of Rs. 48, and 24 respectively) is Rs. 9,888, besides Rs. 72 from six subscribing members in Europe who pay Rs. 12 under Rule 14 b of the Bye-Laws.

The subscriptions actually realised have, however, only amounted to Rs. 7,200, besides Rs. 1096 of arrears, making a total of Rs. 8,296. This sum, though falling short of the amount due, is in excess of the collection of 1872 by about Rs. 800.

The admission fees of new members have amounted to about twice as much as in the previous year, and the proceeds of the sales of publications have exceeded those realised in 1872 by about Rs. 300. The Library sales have also yielded about Rs. 100 more than in the previous year.

The assets consisting of—

Government Securities,	Rs. 7,700	0	0
Funded,	332	0	0
Cash balance,	393	15	10
Balance in the Bank of Bengal,	3,392	14	6

amount altogether to Rs. 11,819-0-0, (exclusive of outstandings amounting

* Rs. 2000 from the savings of previous years and Rs. 5,700 from those of 1873.

to Rs. 8,740, the greater portion of which is on account of arrears of subscriptions.) The Council have ordered the funding of all sums received as compounding fees from life members, and they would further recommend that all admission fees received during the year from new members should also be funded at the close of the year.

The following is a statement shewing the receipts and disbursements of the Society during the last year.

RECEIPTS.

Subscriptions,	Rs. 8,296	2	0
Admission Fees,	1,424	0	0
Publications,	1,537	0	3
Library,	316	6	6
Secretary's Office,	9	3	9
Vested Fund,	238	4	0
Building,	12,916	2	1
Coin Fund,	24	0	0
	Rs. 24,761	2	7

Sundries,	998	13	10
Balance 1872,			
In the Bank of Bengal,	767	9	4
Cash in hand,	143	15	2
	Rs. 26,671	8	11

DISBURSEMENTS.

Publications,	7,270	2	10
Library,	1,518	13	11
Secretary's office,	2,614	0	4
Vested Fund,	5,975	9	11
Building,	3,539	2	6
Coin Fund,			
	Rs. 20,917	13	6

Sundries,	1,966	13	1
Balance,			
In the Bank of Bengal,	3,392	14	6
Cash in hand,	393	15	10
	Rs. 26,671	8	11

The following is the Budget of Income and Expenditure for 1874.

INCOME.

Subscriptions,	Rs. 8000	0	0
Admission Fees,	1000	0	0
Publications,	1500	0	0
Library,	250	0	0
Building,	4800	0	0
Sundries,	750	0	0
	Rs. 16,300	0	0

EXPENDITURE.

Publications,	Rs. 4500	0	0
Secretary's Office,	2650	0	0
Building Repairs,	500	0	0
Do. Taxes,	496	0	0
Coin Fund,	1000	0	0
Library,	3000	0	0
Balance,	4154	0	0
	Rs. 16,300	0	0

Library.

The Library has received an addition of 900 volumes during the past year the greater part of which are presentations from various learned and scientific institutions and individuals with whom the Society is in correspondence. The Council are also glad to report that on application being made to the various local Governments throughout India for copies of all official papers of general interest to be supplied to the Library, many useful and interesting publications of this kind have been presented to the Library and promises have been received of their regular supply in future.

The plan of inserting in the Library List a short abstract of the titles of the principal articles contained in the different publications received by the Society has been carried out throughout the year, and the Council have reason to believe that the change meets with approval.

367 Sanskrit MSS. have been purchased for the Society and 213 lithographed Sanskrit works at a cost of Rs. 312 for the Society and Rs. 250 for Government on account of the Conservation of Sanskrit MSS.

Lectures.

The Council are glad to report that they have been able to organise a series of cold weather lectures on general Science and subjects connected with India, which so far have been fairly attended and will undoubtedly increase the popularity of the Society.

The want has long been felt of some means of the kind of diffusing in India knowledge of the latest European scientific discoveries and for bringing forward information regarding many subjects of Indian or Oriental interest in a more general and popular manner than can be done by papers read at the general meetings. The deficiency of space and the lack of funds have hitherto prevented the Council from carrying out former proposals for this worthy object, but the improvement in the financial condition of the Society has enabled them to try the experiment this year, and it is to be hoped that it will prove sufficiently successful to warrant the continuance of the lectures in future seasons.

Journal.

The Journal continues to maintain a high standard of excellence, and many papers of great value have been published during the year.

About 400 pages of the Journal, Part I, have been printed during the year, and they have been illustrated by 9 plates.

300 Pages of Part II have been published with 19 plates. Of the Proceedings 228 pages have been published.

Bibliotheca Indica.

During the past year, thirty fasciuli of the Bibliotheca Indica have been issued, comprising portions of nineteen different works.

Sanskrit.

In the Sanskrit series, the Council have the satisfaction to notice the completion of several works which had been undertaken some time since. The *S'rauta Sūtra* of Āsvalāyana, containing the liturgy of the Rig Veda, was taken in hand by the late Paṇḍit Rāmanārāyana Vidyaratna, in 1863. After publishing the whole of the text and a portion of its index, the Paṇḍit died, and the work was left in abeyance. Paṇḍit Anandachandra Vedāntavāgīśa has now completed it. The Index extends to 148 pages, and gives in detail the substance of every aphorism of the text. The Paṇḍit has also completed his edition of the *Tāpdyā Brāhmaṇa*, which he had undertaken in the year 1866. It extends to two volumes, comprising 1896 pages. It is the largest Brāhmaṇa of the Sāma Veda, and gives in great detail the ritual of that work. The Paṇḍit has annexed to it an elaborate table of contents which, it is hoped, will prove useful to oriental scholars.

Professor Bharatachandra Śrīromaṇi has completed his edition of the *Dāna Khaṇḍa* of the Hemādri, being the second part of that author's elaborate digest, entitled the *Chaturvarga Chintāmaṇi*. The work extends to 1057 pages, and includes an alphabetical index of the contents, as also of the names of the different authors quoted in the text. As a help to the settlement of the dates of many treatises on Hindu law, this work, it is believed, will prove particularly valuable. Its real author is generally believed to be the celebrated grammarian Vopadeva, though the work is

known by the name of its patron, and the fact of Vopodeva having quoted largely from several of those works which are accepted by some European scholars to be not more than two or three hundred years old, opens a new field of enquiry.

The plan adopted for a complete edition of the *Sāmaveda Sañhita* involves great labour and time, and the work is not likely to be brought to completion for some years to come; but the editor, Paṇḍit Satyavrata Sāmasrami, has devoted his attention very diligently to his undertaking, and the Council have every reason to be satisfied with the manner in which he is conducting it. He has issued five fasciculi during the year under report, bringing up the work to the end of the first volume. The different Indexes annexed to the volume are full and complete.

The *Taittiriya Sañhita* of the Black Yajur Veda is a very large work. It was first undertaken by the late Dr. Roer, who left the country in 1859, after publishing the first volume of 1072 pages. The second volume was completed by Mr. Cowell. On his retirement from India, in 1864, the late Paṇḍit Rāmanārāyaṇa Vidyāratna was engaged to carry on the work, but his untimely death put a stop to it for a time. Professor Mahes'achandra Nyāyāratna has now charge of the undertaking, and he has completed the fourth volume, bringing up the work to the fourth octad. Two more volumes will complete the work. The Professor has also completed the first volume of his edition of the *Mimāṃsā Darsana*, and issued two fasciculi of the second volume.

The *Agni Purāṇa* was undertaken, in 1868, by the late Paṇḍit Harachandra Vidyābhushaṇa who died after bringing out three fasciculi, and the work had to be left in abeyance for a time. Bābu Rājendralāla Mitra has lately taken it in hand, and completed the first volume, comprising about one third of the work.

Of Professor Rāmamāya Tarkaratna's edition of the *Artharva Upanishads* two fasciculi have been published, comprising the *Aruneya*, the *Brahma-vidyā*, the *Kshurika*, the *Chulika*, the *Sikhā*, the *Brahma*, the *Prānāgni-hotra*, the *Nīla-rudra*, the *Kanṭhasruti*, the *Pinda*, and the *Rāmatāpani* Upanishads, with the commentary of Nārāyaṇa. With the exception of the *Rāmatāpani*, which was some time ago edited by Professor Weber in the Roman character, but without a commentary, these treatises are little known, and will prove valuable accessions to the published philosophical literature of the Hindus.

Paṇḍit Chandrakānta Tarkālankāra has published the fourth fasciculus of the *Gobhila Sūtra*, with an original commentary by himself. The work will be completed in course of the current year.

In compliance with a suggestion lately received from Professor Max Müller the Council have resolved to send to press in course of the

current year two very important works on the Vedic literature, viz. the *Aitareya Aranyaka* of the Rig Veda and the *Brihaddevatā* of Saunaka. Bábu Rājendralāla Mitra has already collected ample materials for a good edition of the first named work, and the task of collation is in progress. MSS. of the Brihaddevata are exceedingly rare, but the Bábu has a good MS. of it of his own, and two others have been lent him by his correspondents at Benares. He expects ere long to obtain a sufficient number of MSS. to be in a position to go to press.

Some time ago Dr. J. Eggeling undertook to prepare an edition of the *Kātantravritti*, an old treatise on grammar, for the Bombay Government, but circumstances prevented his sending it to press. He has since obligingly placed his MS. at the disposal of the Council, and it has since been made over to the printer.

The Council have been for some time anxious to bring out in the Bibliotheca Indica an edition of the celebrated poems of Chand, comprising a history of Prithvi Rāj, the last Hindu King of Dihli; but owing to various causes could not do so. They have now the satisfaction to announce that the work has now been sent to press, and a first fasciculus has already been published. The great extent and extremely troublesome character of the work have rendered it necessary to entrust the undertaking to two editors, the first twenty-two cantos being placed in the hands of Mr. Beames, and the succeeding forty-seven in that of Dr. Hoernle.

Arabic and Persian.

In the Arabic and Persian Series, there were issued during 1873, twelve fasciculi, viz. one Arabic, eight Persian, and three Translations from Persian into English.

ARABIC.—Maulawī 'Abdul Hai, of the Calcutta Madrasah, issued a supplement to Fasc. X. of the IVth Volume of *Al-Iḡābah fī tamīz il-ḡihābah*, a biographical dictionary, chiefly of 'witnesses' who knew Muhammad, written by the renowned Ibn Hajar 'Asqalānī. When the work, in 1853, was commenced, no complete MSS. appear to have existed, and Dr. Sprenger, assisted by several Maulawīs, issued thirteen fasciculi (viz. 12 fasc. forming Vol. I., up to the end of *re*, and one fasc., the beginning of Vol. II., containing the letter *ze* and a few pages of *sin*), containing biographies of 3070 'male witnesses.' The work, thus far advanced, was dropped in 1856, from want of MSS. In 1864, it was determined to complete the dictionary as far as was possible, and the IVth Volume was commenced, of which Maulawī 'Abdul Hai has now issued the last portion. The volume itself forms a distinct part of the whole, inasmuch as it contains the names of 1254 male witnesses, whose names commence with the words *abū*, and the names of 1543 'female witnesses' of the Prophet. Of the whole work, therefore, the Society has issued Vols. I. and IV., and the beginning of Vol.

II. Frequent efforts were made to obtain MSS. for the wanting portions of Vols. II and III, but without result, when during last year three MSS. unexpectedly turned up in the possession of Maulawí Kabíruddín Ahmad, viz. one MS. of Vol. II, and two MSS. of Vol. III. Maulawí 'Abdul Hai is now engaged in preparing Vol. II for press, assisted by the *Usud ulghábah*, the *Istiáb* and the *Ikmál*, works which much resemble the *Icábah*. There is, therefore, every hope of completing this important work.

PERSIAN.—Mr. Blochmann issued Fasc. XVI. of his quarto text edition of the *Aín i Akbarí*, which completes the geographical index of the work. Fasc. XVII, containing the preface, title, &c., to Vol. I, is about to appear.

Maulawí Zulfaqár 'Alí, of the Calcutta Madrasah, has issued two fasciculi of the *Farhang i Rashídí*, by 'Abdurrashíd of Tattah, one of the most critical scholars India has produced. Three-fourths of the dictionary, as far as the letter *qáf*, have now been issued.

Maulawí 'Abdurrahim, of the Calcutta Madrasah, has completed his index to *Kháfi Khán's* history, and Maulawí Kabíruddín has issued the concluding pages of the work itself. The Bibliotheca Indica edition of *Kháfi Khán's Muntakhab ul-Lubáb* is, therefore, now complete. The work consists of two volumes. The first contains the reigns of Bábar, Humáyún, Akbar, Jahángír, and Sháhjahán; and the second contains an account of the reign of Aurangzib (as far as the author had sources to consult), the reigns of Sháh 'Alam Bahádúr (who is generally but wrongly called in English histories 'Bahádúr Sháh'), of Jahándár Sháh, Farrukh Siyar, Rafí 'uddaraját, Rafí 'uddaulah, and the beginning of the reign of Muhammad Sháh, up to A. H. 1135, or A. D. 1722-23.

Maulawí 'Abdul Hai has issued an Index of Persons and of geographical names occurring in the '*Alamgirnámah*, together with a biographical notice of the author. The text itself was issued in the Bibliotheca Indica in 1868. The work contains a history of the first ten years of Aurangzib's reign, i. e. till A. H. 1078, or A. D. 1667, when the emperor forbade historians to write the history of his reign.

Maulawí Aghá Ahmad 'Alí completed during last year the *Maásir i 'Alamgiri*, a history of Aurangzib's reign, written in A. H. 1122, or A. D. 1710, by Muhammad Sáqí Musta'idd Khán. The author had been for some time in the service of Bakhtáwar Khán, the author of the *Mir-át ul 'Alam*, and was through his influence appointed a *Waqá'nigár*, or court-news-writer. He was then put in charge of the emperor's carpet for prayer (*já-namáz*), and later he was appointed officer in charge of the household servants. Four years before the emperor's death, he was appointed a secretary of finance (*inshá i nazárat*), and his office as news-writer was bestowed upon his son Muhammad Muhsin. Although his work is short, it is of the greatest importance, because it

is the only reliable native history of Aurangzib's reign that we possess. The author is most exact in his chronology, and his work will be found by historians to be an excellent check on the confused and frequently interrupted account of Khāfi Khān. It was no doubt owing to this fact that the author of the *Tazkirat ussalātin i Chaghtāiyah* used the *Maāsir i 'Alamgiri* for his account of Aurangzib's reign in preference to Khāfi Khān's work.

Maulawī Aghā Ahmad 'Alī's edition is completed in six fasciuli, the last of which is accompanied with a useful Index of Persons and Geographical names, and a short account of the author himself.

The Society has also issued during last year the *Haft Asmān* by Maulawī Aghā Ahmad 'Alī. This work contains a most interesting history of the Masnawī, or epic poetry, of the Persians, and constitutes the editor's introduction to Nizāmi's *Sikandarnāmah i Bahri* (or *Khirdnāmah i Sikandari*), which was edited for the Bibliotheca Indica by Dr. Sprenger, Aghā Muhammad Shustari, and Aghā Ahmad 'Alī, in 1852 and 1869. As Persian epics are written in seven metres, Maulawī Aghā Ahmad 'Alī gave his Introduction the title of 'Haft Asmān,' or 'the Seven Heavens.' Unfortunately, Aghā Ahmad 'Alī died at Dhākā in June last, and only the general portion and the first of the seven chapters have been completed. But incomplete as it is, the Introduction will be found to contain a most valuable account of the history of the Persian epic and full notes on Nizāmi's works.

The death of Maulawī Aghā Ahmad 'Alī has deprived the Bibliotheca Indica of a most painstaking editor. During the years 1865 and 1873, he edited for the Society the epic *Wis o Rāmīn*, the first and third volumes of *Badā'uni's* history, the *Iqbāl-nāmah i Jahāngiri* (jointly), the *Maāsir i 'Alamgiri*, one-half of Nizāmi's *Sikandarnāmah*, and the first two fasciuli of Abul Fazl's *Akbarnāmah*. He was enthusiastically devoted to Persian Literature. Besides the *Haft Asmān*, which he compiled for the Society, he published in 1865 and 1868 his *Muayyid i Burhān* and the *Shamsher i Tezlar*, two important lexicographical works; the *Risālah i Tarānah*, an essay on the Rubā'i of the Persians, in 1866; and in 1872 the *Risālah i Ishtiāq*, an elementary Persian grammar.

Abul Fazl's *Akbarnāmah*, which Maulawī Aghā Ahmad 'Alī had commenced to edit, has been entrusted to Maulawī Abdurrahīm, of the Calcutta Madrasah, and Mr. Blochmann has promised to superintend the edition as far as the names of persons and the geography of the work are concerned.

TRANSLATIONS. Of translations from Persian into English, the Society published during 1873 the first two fasciuli of Major Raverty's translation of the *Tabaqāt i Nāqiri*, which is being printed in England. The third and fourth fasciuli (as far as page 392) have likewise been printed,

and are on their way out to India. Mr. Blochmann issued Fasc. VII of his translation of the *Āin i Akbarī*, which completes the first volume of the work, and contains a full index and Abul Fazl's biography.

In February last, the Council, at the recommendation of the Philological Committee, also sanctioned the printing of the English translation of *Radā'oni's* history by Capt. G. F. J. Graham, Benares. The first fasciculus of the work is about to be issued.

In the end of last year, the Society also received, through the Foreign office, a MS. translation by Col. E. C. Ross, Political Agent, Muscat, of the *Kashf ulghummah*. This rare Arabic work was written by Shaikh Sirhān bin Sa'id bin Sirhān bin Muhammad, of the Banū 'Alī tribe, in or about 1728 A. D., and contains an interesting account of the history of 'Omān. The translation will be issued during 1874.

The following are the names of the different works issued during the last year.

Sanskrit.

The *Srauta Sūtra* of Āsvalāyana, with the commentary of Gārgya Nārāyana, edited by Rāmanārāyana Vidyāratna, No. 269, Fas. XI.

The *Tāpdyā Mahābrāhmaṇa* with the commentary of Śāyanaśākhārya, edited by Anandachandra Vedāntavāgīśa, No. 268, Fas. XIX.

The *Chaturvarga-Chintāmani* by Hemādri, edited by Professor Bharatachandra Śīromaji, Part II, Dānakhaṇḍa, Nos. 267, 274, 278, 281, and 290, Fas. VII-XI.

The *Sāma Veda Saṅhitā* with the commentary of Śāyanaśākhārya, edited by Satyavrata Sāmasramī, Nos. 270, 280, 285, 286, and 293, Fas. VI-X.

The *Saṅhitā* of the Black Yajur-Veda with the commentary of Mādha-vāchārya, edited by Paṇḍita Mahes'achandra Nyāyaratna, No. 231, Fas. XXVII.

The *Agni Purāṇa*, a system of Hindu Mythology and Tradition, edited by Bābu Rājendralāla Mitra, No. 291, Fas. IV.

The *Ātharvanopanishads* with the commentary of Nārāyana, edited by Rāmamaya Tarkaratna, Nos. 276, and 282, Fas. III-IV.

The *Gobhiliya Grihya Sūtra* with a commentary by the editor, edited by Professor Chandrakānta Tarkālankāra, No. 277, Fas. IV.

The *Mīmāṃsā Darsana* with the commentary of Savara Svāmin, edited by Paṇḍita Mahes'achandra Nyāyaratna, No. 208, Fas. IX.

Hindī.

The *Prithirāja Rāsau* of Chand Bardai, edited in the original old Hindī by John Beames, B. C. S. Part I, Fas. I, No. 269.

Persian.

The *Maásir-i-'Álamgiri* of Muhammad Sáqi Musta'idd Khán, edited by Maulawí Ághá Ahmad 'Alí, No. 289, Fasc. VI.

The *Muntakhab-ul-lubáb* of Kháfi Khán, edited by Maulawí Kabír ud-din Ahmad, No. 292, Fasc. II.

The *Áin-i-Akbarí*, by Abul Fazl i Mubárák i 'Allámi, edited by H. Blochmann, M. A., No. 276, Fasc. XVI.

The *Farhang-i-Rashídi* by Mullá 'Abdur Rashíd of Tattah, edited and annotated by Maulawí Zulfaqár 'Alí, Nos. 271, and 279, Fasc. IX and X.

The *Akbarnámah* by Abul Fazl i Mubárák i 'Allámi, edited by Ághá Ahmad 'Alí, Nos. 283, and 284, Fas. I and II.

The *Haft Ásmán*, or History of the Masnawí of the Persians, being an introduction to Nizámi's *Iqbálnámah-i-Sikandari*, by the late Maulawí Ághá Ahmad 'Alí, No. 294.

Index of Names of Persons and Geographical names occurring in the '*Álamgír-námah*, by Maulawí 'Abdul Hai, No. 288.

Arabic.

A Biographical Dictionary of Persons who knew Muhammad, by Ibn Hajar, edited by Maulawí 'Abd-ul-Hai, No. 232, Fasc. 20, Supplement.

Translations.

The *Áin-i-Akbarí* of Abul Fazl i 'Allámi, translated from the original Persian by H. Blochmann, M. A., No. 287, Fasc. VII.

The *Ṭabaqát-i-Náçiri* of Minháj-i-Siráj, translated from the Persian by Major H. G. Raverty, Nos. 272, and 273, Fas. I and II.

Coin Cabinet.

During the year 1873, the Coin Cabinet of the Society received an addition of one silver coin, eight copper coins, a brass token of Muhammad Tughluq and a cast of a Bengal coin of Fírúz Sháh II.

All these are presents from members. One gold coin of Diodotus was purchased.

Steps have also been taken to commence cataloguing the collection. Mr. Blochmann has arranged the Bengal coins, and Maulawí 'Abdul Hai has classified a portion of the Dihlí coins under Col. Hyde's superintendence at the Mint.

Officers.

Mr. Blochmann and Capt. J. Waterhouse have retained charge throughout the year of the editing of the Philological part of the Journal and the

Proceedings and of the other duties of their respective Secretaryships. On the departure of Dr. F. Stoliczka with the Yarkand Mission, in May, Mr. J. Wood-Mason was appointed Natural History Secretary and has since edited the Natural History part of the Journal.

The office of Financial Secretary and Treasurer has been held by Col. J. E. Gastrell.

The Council have the pleasure to again record their satisfaction with the services rendered by Bábu Pratápachandra Ghosha, the Assistant Secretary, and with the work performed by Bábu Manilal Baishak, Assistant Librarian, Sayyid Waliullah, store keeper, and Babu Buddinath Baishak, cashier.

List of Societies and other Institutions with which exchanges of publications have been made during 1873.

- Batavia :—Société des Sciences des Inderlandes.
Berlin :—Royal Academy.
Birmingham :—Institution of Mechanical Engineers.
Bombay :—Royal Asiatic Society.
Boston :—Natural History Society.
Bordeaux :—Bordeaux Academy.
Buenos Ayres :—Public Museum.
Bruxelles :—Académie Royale des Sciences, &c., de Belgique.
Cherbourg :—Société Nationale des Sciences Naturelles.
Calcutta :—Agricultural and Horticultural Society of India.
—— :—Geological Survey of India.
Christiania :—University.
Copenhagen :—Royal Society of Northern Antiquaries.
Dacca :—Dacca News and Planters' Journal.
Dehra Dun :—Great Trigonometrical Survey.
Dublin :—Royal Irish Academy.
—— :—Natural History Society.
Edinburgh :—Royal Society.
Geneva :—Physical and Natural History Society.
Königsberg :—Physical and Economical Institution.
Láhor :—Agricultural Society of the Panjáb.
Leipzig :—Deutsche Morgenländische Gesellschaft.
Liège :—Société Royale des Sciences.
Liverpool :—Literary and Philosophical Society.
London :—British Museum.
—— :—Royal Society.

- London :—Royal Asiatic Society of Great Britain and Ireland.
 —:—Royal Institution.
 —:—London Institution of Civil Engineers.
 —:—Royal Geographical Society.
 —:—Museum of Practical Geology.
 —:—Zoological Society.
 —:—Statistical Society.
 —:—Geological Society.
 —:—Linnean Society.
 —:—Athenæum.
 —:—Anthropological Society.
 —:—Nature.
 —:—Royal Astronomical Society.
 —:—Ocean Highways.
 —:—Agricultural Society.
 Moscow :—Société des Naturalistes.
 Munich :—Royal Academy.
 Madras :—Government Central Museum.
 Manchester :—Literary and Philosophical Society.
 New York :—Commissioners of the Department of Agriculture.
 New Haven :—Connecticut Academy of Arts and Sciences.
 Netherlands :—Royal Society.
 Paris :—Ethnographical Society.
 —:—Geographical Society.
 —:—Asiatic Society.
 —:—Anthropological Society.
 Stettin :—Entomological Society.
 St. Petersburg :—Imperial Academy of Sciences.
 Stockholm :—Royal Academy of Sciences.
 Vienna :—Imperial Academy of Sciences.
 —:—Anthropological Society.
 —:—Zoological and Botanical Society.
 —:—Imperial Geological Institute.
 Washington :—Smithsonian Institution.

On the motion of the President, the Report was adopted. The Scrutineers reported the elections of officers and Members of Council for 1874 as follows:—

Col. H. Hyde, R. E.

President.

Bábú Rájendralála Mitra.

The Hon. E. C. Bayley, C. S. I.

} *Vice-Presidents.*

The Hon. J. B. Phear.

H. Blochmann, Esq., M. A.

J. Wood-Mason, Esq.

Captain J. Waterhouse.

Col. J. E. Gastrell.

Col. H. Hyde, R. E.

Babú Rájendralala Mitra.

The Hon. E. C. Bayley, C. S. I.

The Hon. J. B. Phear.

Col. H. L. Thuillier, R. A., C. S. I.

The Hon'ble Raja Romanáth Tagore.

W. L. Heeley, Esq., C. S.

L. Schwendler, Esq.

J. Geoghegan, Esq.

Dr. S. B. Partridge.

H. B. Medlicott, Esq.

Col. J. E. Gastrell.

H. Blochmann, Esq., M. A.

J. Wood-Mason, Esq.

Captain J. Waterhouse.

} *Secretaries and Treasurer.*} *Members of Council.*

The President then read the following Address—

PRESIDENT'S ADDRESS.

GENTLEMEN,—Being called to fill the Office of President of this Society, I do so with some diffidence, for I feel that coming after one having such great and varied ability as had Dr. Oldham our late President, I am very unequal to the task I have taken up, and I fear that I can only follow at a long distance the steps of my predecessor. All, however, that it is in my power to effect shall be done, and if I am not able to enter so deeply into many of the questions that come before us, I trust I may be able to extend the influence of the Society and to promote the objects for which it has been established.

The Report which has been just read to you will, I trust, justify my congratulation on our improved position in every way. The Society now enjoys a permanent income, at present in the shape of an allowance from Government as compensation for loss of house-rent that the Society would have realized from the rent of this house, had the Museum Building been completed. This will be paid until the Society is able to occupy their new quarters. The building we now occupy, will then be available for letting on lease, and will produce a net income, certainly equal to and perhaps more than the present grant.

This grant from the Government of India was intimated to you in a note attached to the President's address of last year, and I think the thanks of the Society are due to the Government of India for the equitable decision arrived at and for the grant given.

The Council have been, and are now, in communication with the Secretary to the Government of Bengal, Public Works Department, (in whose province the construction of the Museum Building rests) regarding the detail arrangements of that part of the building which is, under the Act, to afford fit accommodation for the Society.

It does not appear that when the building was designed, any specification was drawn out, while it is certain that nothing but the drawings of the bare shell of the building were submitted to the Council of the Society. This has been represented, and a complete specification, describing all those details that are absolutely necessary to render the building fitted for the specific purpose of accommodating the Society, is being drawn out, and the Council have no doubt but that the Society will find the accommodation liberally provided and all that can be desired.

During the past year, the Society have lost the services of our late able Secretary, Dr. Stoliczka. It will be remembered that early in the year the Council learning that the Government of India contemplated sending a Mission to Yarkand, and following the former practice of the Society, addressed Government with offers of co-operation and assistance in furthering the Scientific objects of the Mission. The offer of the Society was cordially received, and a Memorandum of Subjects of Scientific observation was drawn out and furnished to Government for use of the expedition. Some short time afterwards the Council, looking to the great difficulties that would be met in securing and forwarding sufficient geological specimens from Yarkand, made a representation to the Government of India, and pointed out the necessity of attaching to the expedition a Palæontologist in order that in the event of it not being found practicable to secure and forward to India sufficient geological specimens, his special knowledge might come to his aid, and he might still be able to secure and bring with him such information as will enable the solving of the geological problems of the countries through which he passes.

The Government of India accepted the suggestion, and appointed Dr. Stoliczka to accompany the expedition. Several letters have been received from the Camp and it was some time since with great regret and anxiety that the Council heard of the intense sufferings and dangerous illness of Dr. Stoliczka in the journey across the higher passes.

A letter received a few days ago from Dr. Stoliczka and dated Yarkand, shews us that his determined spirit has carried him through all his difficulties, and it is with great pleasure that I can announce to the Society his return to comparative health.

The first part of the Journal for last year extends over nearly 400 pages, and contains articles of most varied interest. Sir Arthur P. Phayre, who has been a steady contributor to the Journal since 1845, has continued his series of contributions to the History of Burma; the Honorable E. C. Bayley brought several ancient coins of great value to the notice of the Society; Col. E. T. Dalton contributed an interesting paper on the Rude Stone Monuments in Chutiá Nágpúr; Dr. Hoernle followed up his researches into the comparative grammar of the Sanskrit Vernaculars; Chand, the old bard of Delhi, has received continued attention from Messrs. Beames and Growse; Bábu Rájendralála Mitra gave sketches of the condition of people in ancient India, and notes on several Sanskrit inscriptions; and Messrs. Thomas and Blochmann have published contributions to the early Muhamadan History of Bengal.

The splendid collection of rubbings of inscriptions which General A. Cunningham forwarded to the Society, has also for the greater part been published during last year. The collection of Muhamadan Inscriptions, which received valuable additions from Dr. J. Wise, and Messrs. Westmacott, Haeley, Bourke, Beale, and Delmerick, have appeared with translations in the Journal and the Proceedings, and will be continued by your Philological Secretary during the present year. General Cunningham's Sanskrit rubbings are still in the hands of Bábu Pratápachandra Ghosha as also the Copper-plate grant of Keshab Chandra of Bengal, which was lately found in Bákírganj and was presented to the Society by Mr. H. Beveridge.

I will not take up your time with a summary of the work done during last year by the Editors of the Sanskrit and Persian publications. The report on this part of the Society's activity has just been read to you. But I must say a few words regarding the researches in Oriental literature and antiquities, made by some of our members, independent of the Society. General Cunningham issued a few weeks ago the third volume of his Archaeological Report, which treats of the various styles of Hindú and Muhamadan architecture and the antiquities of Mathurá, the neighbourhood of Alláhábád, and the Buddhistic relics of Southern Bihár. The Rev. M. A. Sherring of Benares, one of our Corresponding Members, published in the beginning of last year, a volume on the various Hindú Castes, with interesting genealogical tables and notes on the aboriginal tribe of the Bhars. Mr. J. Beames brought out the first volume of his Comparative Grammar of the modern Aryan Languages of India, which treats of phonetical changes, and is accompanied by a singularly lucid Introduction on the Position of the Seven Vernaculars. The notices of Sanskrit MSS., so well known and valuable to all scholars, have been ably continued by Bábu Rájendralála Mitra. His forthcoming report on Orísá will contain a full account of the antiquities of that province. Mr. Blochmann has published his work

on the "Prosody of the Persians." Among the several District Gazetteers, I have to mention the interesting "Memoir of Mathurá District" by Mr. F. S. Growse which contains exhaustive notes on the Hindú and Muhammadan antiquities of the sacred town and its neighbourhood. Nor must I forget the great numismatic undertaking of the day, which Messrs. Trübner and Co. have set on foot, I mean the publication, under the editorship of Mr. E. Thomas, of the "International Marsden." Scholars of all countries and several members of our Society are to contribute to this comprehensive work, which is to contain the medallic history of the whole East.

While on coins, I would ask those who collect coins with no specific object, and there are many such in this country, to give attention to the important part coins play in throwing light on Indian History. Within the last few months you will find that one coin under Mr. Blochmann, our Secretary, brought to light a forgotten, and in the present age, unknown king, while another accidentally dug up in a field, cleared up a difficulty of three years in the date of another reign. These I know are only examples that come home to us, but they clearly confirm what Prinsep, Thomas, Cunningham and others urge, that coins are the basis and indeed in many cases the beginning and the end of Indian History, and I would therefore call upon all such collectors as cannot read their coins, to lend them to the Society to be read, figured and to be recorded, to add to the rich store already contained in the pages of this part of our Journal.*

Passing on to Part II of our Journal, which is devoted to the Natural Sciences.

The three parts of the Journal already published and the fourth which will appear in a few days, are illustrated by 19 Plates in all. Dr. F. Stoliczka has given us another important memoir with valuable anatomical notes on Asiatic land Mollusca; notes on some Malayan Amphibia and Reptilia, and on the Indian species of Thelyphonus; a contribution towards a monograph of the Indian species of Passalidæ, an interesting family of Coleopterous insects (which had been already monographed by Dr. Kaup); and notes on Andamanese and Nicobarese Reptiles. Mr. Wood-Mason has described a new and interesting genus and species of decapod Crustaceans remarkable for being totally destitute of functional organs of vision, like the famous cray-fish of the Mammoth-Cave and several allied forms of crustacea recently discovered by the "Challenger." He has also contributed a description of a remarkable new genus and species of Pycnogonida; the first part of a memoir on the Phasmidæ; a note on some species of the same family of Orthopterous insects, and a description of a new genus of Land-Crabs from the

* I may here note a collection of Sassanian Coins, 547 in number, that have fallen into my hands; these coins will doubtless give great assistance in the work Mr. Thomas is engaged on. They are now in the hands of the Hon. E. C. Bayley.

Nicobars. Three of Mr. Wood-Mason's papers have been reproduced in European Journals and the appearance of Dr. Stoliczka's notes on the Thelyphoni was quickly followed by the criticisms of Mr. A. G. Butler of the British Museum.

I mention these facts as shewing the justness of the remark made in another part of this address to the effect that the writings of our naturalists are not so unknown to their brethren at home as some seem to imagine. Mr. Kurz has given us the second and third fasciculi of his new Burmese Plants and Dr. G. Zeller has described the Algae collected by Mr. Kurz in Arracan and Burmah. The contributions of Dr. Dobson have been as numerous and as valuable as in former years, the most noteworthy of his communications having been his description of a new and remarkable Bat from Johore, in the Malay Peninsula, and his monograph of the Indian fruit-eating Bats. In Dr. Dobson who left Calcutta a few months ago at the expiration of his term of service in India, the Society has lost a valuable member and the Museum at Netley gained an enthusiastic Curator. Mr. W. Theobald has described and figured some new species of Unios.

A modest work on Physical Geography has been published by Mr. H. F. Blanford which has been written specially for Indian students, and in the latter chapters, contains a description of the Geology and climate of India.

All members of this Society, particularly readers of Part II of the Journal, will have seen how rich the Journal is in contributions to Natural History and will acknowledge how great is our debt to our Secretaries and to those who follow up this study. I could, however, wish that we could congratulate ourselves as much on the contributions of papers on subjects in Natural Physics. We cannot, however, do this, for it will be seen that for years there has been (with the exception of some very able papers on Electrical subjects) a marked absence of Physical Science from our Journal. This is attributed to two causes:

First. From the rapid communication with Europe, the facilities are daily increasing for sending such papers to journals and publications, specially devoted to the subjects in which (according to general opinion) these papers will obtain a wider and more useful circulation among those for whose special study they are intended.

Second. That all those who are qualified to write on Physical Science questions, have so much occupation in the practical work of their life, that time cannot be spared.

I think this is much to be regretted. I would point out that Natural History papers are not lost in our Journal, but on the contrary are quoted throughout Europe, and that the Electrical papers, to which I have alluded, have also been extracted by most scientific journals.

The question is one that calls for our grave consideration, and I would

earnestly ask the attention of every member occupied in scientific pursuits, or whose study is in any way turned to these subjects, to contribute to the Journal such as may come within his knowledge, so that the end of the Society may be better and more generally fulfilled, and that the words of our Founder, viz., "The bounds of its investigation will be the geographical limits of Asia, and within these limits its enquiries will be extended to whatever is performed by man or produced by nature," may be truly and faithfully carried out in their most extended sense.

In the scientific labours of the year, we find that the Survey of India has made marked progress, and has given a considerable addition to our geographical knowledge of the Eastern Frontier.

The geographical exploration of the Frontier has been pushed on vigorously. All the intermediate territories occupied by the Lushais and lying between the Cachar and Manipore Frontier and Hill Tipperah, left undone by the parties with General Bouchier, and General Brownlow's columns in the previous season, have been very successfully described. The Garo Hills, hitherto a perfect *terra incognita*, have likewise under the protection of the military expedition, sent to coerce these refractory quasi-independent people, been well delineated, entirely filling up the blank which has so unaccountably existed for so many years in the Map of India and which separated the long occupied districts Goalparah and Gowhatty on the one side, from Mymensing and Sylhet many years under British rule on the other.

In the Nága Hills, the Survey has been extended to Sámagúting and to the Manipúr Frontier, and a few seasons more will, it is hoped, fill up all the Hilly Territory subtending the Assam Valley south of the Brahmaputra River.

These Topographical Surveys have been drawn expressly for the purpose of reproduction by the photozincographic process and thus are at once issued for the use of the local officers and the public, a process which it is expected will shortly be superseded by the superior photo-collotype process. This advancement (to a degree hitherto unknown) in the rapidity and excellence of work, must contribute much to the early production and correction of maps, the materials for which in these countries have been obtained under the greatest difficulties which nothing, but the organization, skill, and determination that has ever characterized the Survey Department, could overcome, and I cannot but think that such progress is a subject for the acknowledgement of our Society.

Turning to the Trigonometrical proceedings, we find that the Pendulum operations in India have been completed, that the pendulums have been swung in Bombay, Aden, and Egypt and finally at Kew.

The Tidal observations which Col. Walker, R. E., Superintendent G. T.

Survey, devised, and which arose from the proposals that emanated from Dr. Oldham, our late President, who pointed out that investigations should be made of "the secular changes in the relative level of land and sea which were believed to be going on at various places on the coast of the Bombay Presidency, and more particularly at the head of the Gulf of Cutch," are now being carried out and the whole of the detail of the work is given in the very interesting Report of the Trigonometrical Survey for the year 1872.

During the past year, as a contribution of data for the determining the figure of the earth, the Great Trigonometrical Survey Department has been engaged on certain Electro-Telegraphic determinations of differences of longitude on the parallel of 13° .

This arc of parallel was selected for several reasons. It extends from Madras to Mangalor passing through Bangalor about midway. There are Telegraph stations at each of these places and great facilities for communication.

The arc is in 13° and is of peculiar interest, in that it is situated much nearer to the Equator than any similar arc which has yet been measured in any part of the globe.

The arc is $5^{\circ} 24' 12''$ or about 364 miles, and it was on this arc that Col. Lambton first endeavoured in the years 1802-5 to determine the length of a degree of Longitude by the method of observing the astronomical latitudes and azimuths of a series of reciprocating stations along it, a method which though ill-adapted to low latitudes, was the only one then feasible for him to employ. Thus it will be seen that circumstances have necessitated the selection of the same parallel of latitude for the commencement of the determination of longitudinal arcs by the modern Electro-Telegraphic method that was chosen at the commencement of the present century by Col. Lambton for his corresponding investigations.

The detailed description will be found in Col. Walker's Report, but I may note that the operations were carried on under certain difficulties for there was the necessity of employing a Telegraph wire which could only be placed at the exclusive disposal of the observers for a few periods and those very brief, and though the operations were invariably performed during the night, when the ordinary traffic on Telegraph lines is comparatively little, it was found that the unrestricted use of a wire could, as a rule, be only conceded for four periods of 15 minutes each; at intervals of two hours apart; on two nights, however, the use of the wire was granted for two hours at a time, but the then unfavourable state of the weather at Madras prevented this concession from being taken to account there.

The preliminary results alone have as yet been obtained and they give a Telegraphic determination of arc less than the Trigonometrical determination by 13.95 seconds of arc.

A second edition of the Map of Turkistan containing much new information of the Geography of Central Asia has been published.

The special Trans-Himalayan explorations by native agents are being carried on into the regions beyond the Hindú Kush Range, into that part of Thibet which lies beyond the northern water-shed of the Brahmaputra River at the Desert of Gobi and Great Tibet.

This time last year Dr. Oldham from this chair called your attention to the arrangements for observing the Transit of Venus.

The Government of India early in 1873 expressed their intention of confiding the arrangements for these important observations to Lieutenant-Colonel Tennant, R. E. Some time has unfortunately been lost, when there was little to spare, owing to the Secretary of State for India having at first declined to sanction any instrument except a Photoheliograph, but at the request of the Government of India the necessary supply was ordered in July last. Colonel Tennant has received information that the Photoheliograph will be despatched from England in February and that the very valuable addition of M. Janssen's apparatus for observing the contacts photographically will follow next month. Of the other instruments nothing has been heard. Meanwhile the Government have sanctioned the funds necessary for building an observatory, and Col. Tennant is proceeding with the arrangements at Roorkee. Col. Walker, Superintendent of the G. T. Survey, has been enabled by changes in his Department to make some instruments available, which will partially fill the place of what were ordered from England, and Col. Douglas, R. A. has also contributed some time-keepers.

Col. Tennant proposes to observe at Roorkee where he will be assisted by Captain Campbell, R. E. of the G. T. Survey. He has been authorized to send an Officer (probably Captain G. Strahan R. E.) as far up into the Panjáb as possible to get eye observations of the last contact of Venus and the Sun. If, however, the instruments ordered by the Secretary of State should not arrive, it will be necessary to divert those intended to be sent to the Panjáb.

It is understood that observations will be made at Madras by the Astronomer and at Bombay by the Superintendent of the Kolaba Observatory who, however, has few appliances, and at the Head Quarters of the G. T. Survey Dehra Dún.

Having thus stated what is being done in India, it will be interesting to mention what is in progress elsewhere. The British Government have been long preparing under the superintendence of the Astronomer-Royal to send expeditions to various parts of the world. The stations selected are Alexandria, the island of Rodrigues and Kerguelen's Land in the West and Waahoo, Auckland, N. Z. in the East. A second station near Waahoo will

also be occupied, and Lord Lindsay has undertaken the whole arrangements for an expedition to the Mauritius. Her Majesty's Ship "Challenger" has been instructed to examine proposed stations, the details of which have been published.

The Russian Government have undertaken to provide for 27 Stations in Northern Asia and Eastern Europe. The German Government, it is believed, intend to observe in Persia, at the Mauritius and in New Zealand; and the French occupy the Marquesas Island and, it is believed, Tahiti and a station in China. The American Government propose to place a station on Russian Territory on the Pacific Coast, one at Yokohama, one at Peking and another either in China or Japan, and also to occupy the Sandwich Islands. This is an imperfect sketch as it is difficult to procure full information, but it will suffice to show how great the importance of the observations is felt to be by men of science in all parts of the world.

When the British Association, as the President brought to your notice last year, urged on Government the necessity for measures to observe the Transit of Venus, they at the same time urged the establishment of an Observatory for Solar observations in India. Since then the Council of the Royal Astronomical Society have authorized their President to press on Government the necessity of aid to Astronomical Physics especially by the establishment of a new Observatory in the Highlands of India, or some other part of the British dominions equally favourable for the use of large instruments. It is therefore satisfactory to know that the instruments for the Transit of Venus were applied for and sanctioned for a Solar Observatory. It is hoped that when their immediate purpose in observing the Transit of Venus has been served, no time will be lost in considering how their second end may be best served. There is no part of the British Territory where advantages can be had superior to those offered by the mountain range of India, and it appears incumbent on those who have such facilities for advancing knowledge to turn them to some account.

Turning to the progress made in Physical Science there is not much to bring to your notice. In India, however, Spectroscopic observation is making some progress in the Department of the Great Trigonometrical Survey and the atmospheric lines of the Solar Spectrum are being observed.

Mr. J. B. N. Hennessey has continued observing and mapping the atmospheric lines of the Solar Spectrum, employing in supersession of the instrument formerly used, an excellent three-prism (compound) spectroscope with automatical adjustment belonging to the Royal Society of London. This instrument is placed at a height of about 6,500 feet above sea level, on a projecting spur of the Himalayan range on which the Sanitarium of Mussoorie is located, so that a clear view is obtained of the Sun down to the very horizon; this is essential, for it is only when observed

some 3 or 4 diameters from sun-set that the Solar Spectrum exhibits the atmospheric lines or absorption-bands, though there are some exceptions to this rule; the conditions under which the Spectrum is thus seen are indicated by "Sun-set" in contradistinction to observations made "Sun-high" between 10 A. M. and 2 P. M. the latter Spectrum is already established in Kirchhoff's well known Maps, on which the Sun-set Spectrum is now being drawn. Proceeding in this manner, Mr. Hennessey has mapped the atmospheric lines from the extreme red to F, and the results may be expected to appear in due course in the papers of the Royal Society of London.

In my own Department, Minting, there is some reason to hope that Spectroscopic analysis will ere long prove a valuable aid in the operations of refining and assaying. Mr. Chandler Roberts, Chemist of the London Mint, in remarking on the use of the Spectroscope in determining the amount of Gold present in the Gold-Copper Alloy, *i. e.* the Sovereign, writes:—

"In former reports I have shown that the existing method known as the gold parting assay, affords results which are trustworthy to the $\frac{1}{100000}$ part of the original weight of the assay piece, and without being unmindful of the really wonderful accuracy of the method now used, I am satisfied that in the examination of a series of gold-copper alloys by means of the spectroscope differences of composition more minute than the $\frac{1}{100000}$ can be readily distinguished. The advantage of the proposed method consists in the fact that the value of a single assay piece, can be determined in a few minutes while an assay by the ordinary method can hardly be completed in less than two hours."

Now,—This comparison of the time occupied, does not give any adequate idea of the practical benefit that would be derived from the perfecting of this system of assay, if it be found to be sufficiently trustworthy; for though the period necessary for the assay will not exceed a few minutes, two hours, which is given as the time necessary for any single assay under favourable circumstances, can never in practice represent the time actually occupied in large operations and which we have never been able to reduce below two days for Silver and one for Gold.

In a paper lately read before the Royal Society, some further information was given regarding the progress of the experiments that are being carried on.

The Qualitative Spectrum analysis is known to depend on the position of the lines. The Quantitative Spectrum analysis, on the other hand, depends on the length, brightness and thickness of these lines.

The position, length and, to a certain extent, thickness are definite exhibitions and are therefore susceptible of accurate measurement, but brightness is not so definite and can only be estimated. For the more accurate reading and recording Spectroscopic analysis photography is now used.

Up to the present the system adopted has been to examine under the spectroscope the unknown alloy together with a check-piece of known composition, and it is found that the most minute differences can be detected.

It will be easily seen then, that before a system of assay by this method could be worked, an accurate map of the spectra due to all the gradations of the alloy table would have to be made, which would be a work of much labour and time, greatly increased by the fact that we constantly detect the presence of several metals at one time in the bullion tendered to the Mint.

There is then much to be done, but still we look forward with great interest to the perfection of the process, for in addition to any aid that a trustworthy system of spectroscopic analysis will give to assaying operations, I have hope of deriving great assistance from it in our melting and refining operations. In conducting the Bessemer steel process, the spectroscope has been of great service, of late it has been much used in Germany, and it appears probable that it may prove to be in some degree useful in the operations I have noted.

In Electricity, only a few revivals and new applications have been made. Foremost is the revival of Duplex Telegraphy, *i. e.* the method of sending messages simultaneously along the same wire in opposite directions. To Mr. Stearns, an American telegraph-engineer, it is due that this important subject was prominently brought up again by his having actually succeeded in introducing practically the long and well known methods of Duplex Telegraphy on some of the American telegraph lines. His success is due to the introduction of condensers for the purpose of balancing the charge and discharge of the line. Certain experiments were tried on the Indian lines in November last year: the experiments which were made between Allahabad—Calcutta and Allahabad—Jabalpur during October and November, were very successful and showed the entire practicability of Duplex working. At present arrangements are being made to finally introduce the system on one of the important main lines between Calcutta and Bombay.

The first and great requirement in connection with Duplex Telegraphy is a general mathematical investigation to decide on the best method available, and for this method to calculate the best resistance arrangements and distribution of condensers, required for any given line, overland or submarine; for the results of such an investigation would be a guide for practical telegraph-engineers to start Duplex working under the most favourable circumstances and a paper on this subject, *viz.*, on the general and particular laws which regulate Duplex Telegraphy was yesterday read by Mr. Schwendler to the Physical Science Committee.

Referring to the Electro-Telegraphic determination of the differences of Longitude on parallel 13° and in which I have already brought to your notice

the difficulty of placing the telegraph line at the disposal of the observers, it will be obvious how much the introduction of the method of Duplex Telegraphy, would facilitate such operations and how important it is that such facilities should exist.

Another great improvement in the application of electricity is represented by the magneto-electric machine of Gramme, which is based on the principle of Siemens, Wheatstone and Wilde, to accumulate electricity by the transformation of mechanical force into magnetism and electricity. The new features in this machine are the better coiling of the revolving wire and an improved construction of the commutators by which the extra currents are partly eliminated and the total effect of the machine greatly increased.

The effect of this machine was tried in London last summer for producing marine signal lights from the top of the Houses of Parliament. The best optical instruments aided the trial and the success was very great and the light brilliant.

This cheap mode of producing enormous quantities of electricity has further suggested more extended applications of the electric current in engineering branches and it is not improbable that metallurgy will receive much aid from it in the production of pure metals.

Before leaving this branch I would ask your attention to the question of Earth Currents. The subject is referred to by Mr. Schwendler in the second part of his instructions for testing telegraph lines.

Earth Currents. These are caused by a difference of potentials between the two points of the earth with which the earth plates are in contact. To measure these currents and to determine their directions and the electromotive force producing them, is of the greatest scientific interest.

The phenomenon of earth currents is generally, however, much obscured by various causes, especially the polarization of earth plates, and by other causes of which we shall speak hereafter. All that we can do is to measure the total effect of all the causes acting, and only rarely are we able to attribute to each cause its proper effect. Still we are able to say from four years' experience of testing Indian lines, that real earth currents do permanently exist, although we have not been able to estimate the electromotive force or to determine the law of change in direction in each particular case.

To be in a position to do this, special observations would be necessary.

Further: Earth Currents attain their maximum strength when those "magnetic storms," occur which seem to accompany all great perturbations of the sun's surface, and are generally marked by the appearance of vivid Auroras. During such periods, as in the autumn of 1849-50 and 1870, communication is rendered impossible except in cases when the earth can be thrown off and a second wire used for the return circuit.

Looking then to the conditions with which the question is surrounded and to the vast country we live in, it is evident that there is no country that offers so large a field and such facilities for observation as does India. In the first place in no country in the world is there so large and so complete a Telegraphic system under one administration, in no country in the world are the electrical conditions so good as they are for several months of the year in the drier climates of India, nor is there any Telegraph system that can compete with that of India in the excellence of its mechanical and electrical conditions.

The expense of making observations would be trifling, and Colonel Robinson, the Director-General of Telegraphs, is fully alive to the importance of the question and is anxious to see the observations carried out.

Looking then to these circumstances I think it becomes the duty of the Society to urge on the attention of the Government, the desirability of carrying on a complete system of observing earth currents in the Telegraph Department and I would recommend that the Physical Science Committee of this Society consider the question.

The Society are aware that a scheme for somewhat supplementing the work begun in the "Porcupine" and now being carried on by the "Challenger," was proposed for dredging in the Indian Seas. The Government of India supported the scheme, and the Secretary of State sanctioned the purchase and sending to India of certain appliances selected under the advice of the Royal Society. Some of these have arrived, and I am informed that others are being procured. The progress, however, has been lamentably slow and until all appliances are received, nothing can be done.

The scheme which was heartily supported by the late Commander-in-Chief, Admiral Cockburn, was, that if such appliances as would be necessary, were prepared, the Commander-in-Chief, whenever the exigencies of the service permitted, and which he thought would be frequent, would order one or more of the smaller vessels of the station for the work.

The Society recommended that a Committee should be formed to direct the operations under these arrangements, but owing partly to the lamented death of Admiral Cockburn, and partly to the non-arrival of the apparatus, no Committee has ever been formed.

At present nothing can be done in dredging, for I feel sure that our Society would not, in the present unfortunate state of part of the country, wish that Government should incur the slightest avoidable expenditure, but I do think that the Committee should be formed to give the work an existence, the function of the Committee being simply to get, as may be possible, all in readiness so as to take advantage of the first opportunity of any available vessel that might offer, instead of running the risk of losing an opportunity, however small, through want of preparation.

During the past year, the question of establishing a Zoological Garden has been brought before the Council of the Society, by Mr. Schwendler. The question had previously been frequently considered, but from the difficulties of procuring funds and a site, it had never as yet been found possible to carry out any proposal. The Society, however, took up Mr. Schwendler's scheme warmly and called a meeting of all those residents of Calcutta who were considered likely to advance the project. The Agri-Horticultural Society joined and a deputation waited on the Lieutenant-Governor of Bengal, but still the want of funds and of a site, stopped all proceedings and the question now rests thus. If the Town or any other Body or Society can supply a site, there is every probability of a Zoological Society being formed, which the Asiatic Society would support as far as lay in its power. The question is important. The Zoological Societies of Europe look anxiously for the maturing of the scheme, and this has been forcibly expressed by Dr. Bodinus, Director of the Zoological Garden, Berlin, in a letter to Mr. Schwendler.

It is considered that India offers the greatest facilities, not only for establishing a local collection for promoting the study of Zoology locally, but that it offers facilities for giving the greatest assistance to all the Zoological Societies throughout Europe and that a Society in Calcutta would thus have a far more extended sphere of useful action than any other Zoological Society could hope for.

Considering the influence and power of assisting that such an institution would have, it certainly seems incumbent on the Asiatic Society to support the scheme to its utmost, and hence I trust that as soon as the condition of the country admits of it, we shall be able to proceed in the matter.

Of the labours of the Geological Survey Department, I must advert to its contributions to the Vienna Exhibition which have met with most marked recognition, and especially for its excellent collection of Salt, Iron and Coal there exhibited, and which latter have demanded the greatest attention from all interested in the question of mineral fuels.

A Diploma of Honor was awarded to Dr. Oldham for the high interest attaching to the collections contributed by the Geological Survey of India.

This year has seen the completion in the *Palaeontologica Indica* of the great work upon the Cretaceous Fauna of Southern India, forming four large quarto volumes. The plates are admirably executed, while the range and precision of Dr. Stoliczka's labours give to this work a prominent place in Palaeontological literature.

The most noteworthy facts of the year in Indian Geology are: first, the discovery by Mr. King in the lower Godávari valley, of a zone containing marine fossils among the upper members of the great stratigraphical series

to which our coal measures belong. Some light may thus be shed upon the obscure homotaxy of these interesting formations. Secondly, the late discovery of a seam of Anthracite Coal by Mr. Mallet of the Geological Survey which has an amount of unusual interest; first because it is the result of a search undertaken on theoretical grounds, and secondly because it promises to throw some additional light on the geological structure of the Himalayas. In 1849 Dr. Hooker found in a little stream leading from the Pankabarry Bungalow, some specimens of *Vertibraria* and *Trizygia* which are well known fossils of the Damúdah coal-fields. At this place the stream cuts its way through beds of sandstone which in some places contain bands of lignite and belong to the Sub-Himalayan Tertiary Rocks. Dr. Hooker appears to have inferred that these beds were older than those yielding the fossils, since they appeared to dip under them. Dr. Hooker's error was corrected in 1856 by Mr. W. T. Blanford who found that at the very head of the little stream in question, the Tertiary sandstones rested against a graphitic band from which the Damúdah plants had clearly been derived, and which is quite independent of the Tertiary rocks and very much more recent. This investigation being made in the height of the rains, and the locality being an unhealthy Terai, the bed could not be then traced up, and it was not until the present season, that Mr. Mallet was sent to follow up the discovery.

You know what great attention the Coal question is now demanding in England, in instance of its importance I may mention that one of the greatest authorities on the subject, Dr. Siemens, stated in a lecture delivered at Newcastle on behalf of the British Association, in September last, "that from the simple rise in price of 8 shillings per ton during the year 1872, the British consumer of coal had to pay £44,000,000 more than the market value of former years for the supply of his coal; the consumption in Great Britain was 110,000,000 tons per annum."

He estimates the consumption of fuel is so wasteful, that if it was used in a careful and scientific manner, the consumption could be reduced by half, and he further estimates that in the production of iron and steel and in steam power, the aid that science gives towards improvement and economy effects already an actual annual saving in expenditure of full 4 per cent. additional every year.

The question of mineral fuel equally demands our attention in this country. Hitherto Indian coal has not been used either for metallurgical purposes or to any extent for ocean-going steamers, so that there has been a considerable importation of English coal and coke.

For the removal of difficulties in the former case, I have taken the first step by the introduction of Siemen's Gas Furnaces in which coal from the Raneeunge field, is now used for metallurgical purposes, and for which English fuel was formerly imported.

The introduction of these furnaces has been, as may easily be conceived, a work of considerable difficulty, but they are now perfectly successful and are worked with an ease scarcely hoped for some time since.

I look to this as a very great step made in the Coal question of India, both in respect to its application and to its economy; for where distances are so great, economy in working means extending the area over which coal is available.

As to the second question, I have for a long time been employed on a very extensive series of Coal Trials, the results of which I hope to be able soon to make public, when it will be found that the duty done by many of the coals from the Raneeunge field comes near to that done by English coal and gives hope that ere long Indian coal will take a better place among mineral fuels.

You are also aware the Secretary of State sent out early in the year Mr. Bauerman to report upon the Iron and Coal-fields of India with a view to the manufacture of Iron in this country.

Mr. Bauerman's preliminary report has been sent in and the Laboratory Department, Geological Survey, is now actively employed on the necessary analysis of Ores and Coals and Limestone for the final report which it is to be hoped will be published at an early date.

In Meteorology, some progress has been made in Bengal in discerning the causes and courses of the Indian Monsoons. But it is not possible to complete this work, nor indeed to gain any satisfactory acquaintance with Indian Meteorology so long as no information can be obtained from the Punjab, Bombay and Madras.

A very extensive system of Weather-Telegraphy has just been established in the China Seas under the control of the Inspector-General of Customs and it is intended to extend it from Possiet in the Russian Territories in the North to Batavia in the South, with a view to warning all parts of the coast of the approaching storms. Stations for observing and telegraphing the weather are established on several parts of the Coast, and in Japan, the Phillipines, &c., and then there will be three stations in the interior, viz., Pekin, Hongkong and Kinkiang.

With the example of China and those seas before us, I do think that the question is one that demands the attention of our Society. The Government of India are liberal in their provision of instruments, but I fear that throughout the greater part of the country, the liberality is wasted.

The necessity for taking and recording observations seems to be acknowledged, but there is a want of some carefully drawn out scheme. At present the instruments are distributed to those who cannot possibly devote sufficient time either to learning how to use the instruments or to use them, and yet this should not be. For when there are distributed over

India, such a vast number of European troops, one of whose difficulties is, want of occupation, surely there will be found men in sufficient quantities fit and willing for the work.

If you look back through our records, you will find that whenever suggestions have emanated from this Society, the Government of India have always given that attention they deserve, and have always cordially accepted any practical scheme.

All scientific men throughout the world have pointed to India as the fittest field for Meteorological observations, and they all agree that India can do more towards solving Meteorological problems than can any other country. With this before us, and with the knowledge that the Government spends sufficient money, which if only properly directed, would do much of what is required, it is a reflection on us, that this great Empire has done so little, and I think it is the duty of the Society to move in the matter.

In 1869, this Society took up the question of teaching Physical Science to the people of this country. At the close of the previous year, our President, Dr. Fayrer, brought to your notice the serious discouragement that the study of Physical Science had met with in this country and Dr. Oldham on succeeding to the chair followed up the question. The Council addressed His Excellency the Governor General as Patron of our Society and as Chancellor of the University, and urged the addition of an elementary knowledge of Natural and Physical Science to the course required from every candidate for matriculation in the University of Calcutta. The teaching of Physical Science has always been considered by this Society as of the utmost importance. It must then be to us a subject of congratulation that His Honor the Lieut.-Governor of Bengal has this year taken the practical step of teaching what must be held to be the most necessary branch by appointing a professor of Chemistry at the Presidency College.

Mr. Pedler is the first professional chemist that has been appointed to teach this all important science in Bengal, and a laboratory is being erected by the order of the Lieut.-Governor, in which it will for the first time be possible to teach practical chemistry. With this before us, and seeing the practical turn that the Government of Bengal has of late given to education, there is some hope that we are tending towards educating the people more thoroughly, and that we have taken the first step towards leading them, as Dr. Fayrer rightly said, from lowest to highest truths, by instructing them in the subjects included under the comprehensive term 'Physical Science' and by imbuing them with a comprehension of those general laws by which all physical phenomena are regulated.

Gentlemen, there is much to be said on these subjects, but time will not permit more. I fear I have already trespassed too much on your patience, and I must leave what I leave to say to some other opportunity.

Colonel Thuillier said, he thought the meeting would agree with him in saying that their worthy President was entitled to their best thanks for the interesting address he had just delivered, and also to the thanks of the Society at large for his care and attention to the various duties of his office during the past year. He had no doubt, the same regard for the interests of the Society, would be continued during the current year under Col. Hyde's presidency. The thanks of the Society were equally due to the several Secretaries and Office-Bearers for their unremitting attention to their duties.

Messrs. F. W. Peterson and A. Pedler were elected to audit the accounts for 1873.

The Meeting was then resolved into an ordinary Monthly General Meeting.

Col. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

Presentations were announced—

1. From the Royal Herbarium at Leyden, a copy of "*Illustrations de la Flore de l' Archipel Indien.*" Livr. 1-3. By F. A. W. Miquel.

A copy of "*Musée Botanique de Leide*" Livr. 1-3. By W. F. R. Suringar.

2. From the Author, a copy of a work entitled "*Microscopic examinations of Air.*" By D. D. Cunningham, Esq. M. B.

3. From the Author, a copy of work entitled "*Bhagavat-Gita and the Bible.*" By Prananatha Pandit, B. A.

4. From the Superintendent, Great Trigonometrical Survey of India, Dehra Dún, two copies of "*General Report on the operations of the Great Trigonometrical Survey of India during the year 1872-73.*"

5. From the Author, a copy of "*Observations of the Filtration of the Hughli water for the Calcutta Water-supply.*" By D. Waldie, F. C. S.

The following gentleman, duly proposed and seconded at the last meeting, was balloted for and elected an Ordinary Member.

Dr. C. J. Jackson.

Mr. Jules Schaumburg proposed at the last meeting by the Council, was balloted for and elected an Associate Member of the Society.

The following are candidates for ballot at the next meeting—

A. C. Lyall, Esq. C. S., proposed by Col. H. L. Thuillier, C. S. I., seconded by A. O. Hume, Esq., C. B.

A. Crombie Esq., M. D., Medical College Hospital, proposed by Dr. S. B. Partridge, seconded by Capt. Waterhouse.

R. Brown, Esq., M. D., F. R. C. S., Political Agent, Manipur, proposed by Dr. J. M. Foster, seconded by Mr. H. Blochmann.

C. H. Wood, Esq., Government Quinologist, proposed by Dr. G. King, seconded by Capt. Waterhouse.

Commander A. D. Taylor, late Indian Navy, proposed by Col. H. L. T. Millie, C. S. I., seconded by Capt. Waterhouse.

J. H. Haworth, Esq., proposed by S. H. Robinson, Esq., seconded by Dr. Waldie.

The following letter from Mr. E. V. Westmacott was read—

Calcutta, January 25th, 1874.

MY DEAR MR. BLOCHMANN,—‘I have been reading with much interest your paper on Bengal Geography. Will you allow me to offer a few remarks upon it?’

‘I think if you compare the *Riyáz us saláṭīn* with Dr. Buchanan’s note on the Muhammadan Kings of Bengal, in his report on Dínájpúr, you will agree with me in believing both to have been taken from the same authority, at least, Buchanan says, was a manuscript he found at Poroowa, [Paṇḍuah] close to Mr. Udney’s residence, and likely to have been used by his protégée who wrote the *Riyáz us saláṭīn*. I have spoken with people who have seen this manuscript, and believe it to have been a cotemporaneous record of burials, kept up at Poroowa, with historical notes, ever since the days of the saint Qutb Sháh (A. D. 1440). I have tried to get a sight of this MS. with a view to publication, but the *mutawallis* tell me it was taken away by one of the Collectors of Púrniah.

‘The country Barendra I identify with the name ‘Borind,’ no longer applied to the whole country once called Barendra, but to the high ground on the frontiers of Dínájpúr, Rájsbáhi, and Máldah. The name is commonly used.

‘Ekdála* I have not yet identified. I cannot accept Mr. Edward Thomas’ suggestion of Jogodol, of which the last o is pronounced not like o in doll, but o in dole. There is a place called Chaudála east of Poroowa. I do not know Dodalá; from the spelling I should expect to find the a in dál long, as it is pronounced in Chaudála. From the description of Ekdala, as situated in an inundated country, I think it may have disappeared in some change in the course of one of the rivers, perhaps of the Mahánandá, which flows a very little way to the westward of Poroowa.

‘The native name of Sylhet is Sreehotto to this day.

‘The word ‘Koeh is always pronounced with a nasal sound in Dínájpúr, but this is not the case in the form *Koshyo*.

* For Mr. Westmacott’s identification of Ekdálah vide April’s Proceedings of this year. THE EDITOR.

'In speaking of the Parganah of Barúr, I should have said that it is in both Purniah and Dinájpúr districts. It is on the river Nágór. Can the place *Jor* of which the Shikdar was also ruler be the Parganah Ajhor on the frontier of Dinájpúr and Máldah?'

The President announced that the lectures for the ensuing month would be—

On the 11th "on the Polarisation of Light," by the Rev. Fr. Lafont.

On the 25th "on the Primitive Aryans," by Bábu Rájendralála Mitra.

The following papers were read—

1. *On the Theory of Duplex Telegraphy.* By L. SCHWENDLER, Esq.

This paper was read before the Physical Science Committee on the 3rd February, 1874, and was communicated to the Society the following day.

After having given a brief historical sketch of this important invention, and after having stated the reasons of its non-introduction in Duplex Telegraphy, Mr. Schwendler gave a short outline of his mathematical investigation.

The general results he obtained, may be stated as follows:

"Considering the line as a variable conductor only, but not acting perceptibly as a Leyden jar, Mr. Schwendler found that by using the Bridge method, the best resistance arrangement in either station would be that all the branches of the diagram, with the exception of the one which lies opposite to the line, should be made each equal to half the given line resistance; while the branch opposite to the line should have a resistance of one-sixth that of the given line resistance. Further, that this branch, the smallest of all, should be invariably used for re-establishing balance when disturbed."

Under these circumstances, the following essential conditions, necessary and sufficient to bring Duplex Telegraphy to success, are fulfilled.

a. Any disturbance of balance has the least possible effect on the regularity of the signals. (*Single and Duplex Signals.*)

b. If balance is disturbed it can be re-established by a single adjustment (the greatest desideratum in practice). This condition Mr. Schwendler calls "immediate balance."

c. Maximum current.

d. Maximum magnetic effect of Maximum current.

Mr. Schwendler illustrated his investigation by an actual trial of the method and proved by experiments, that having the best resistance arrangements at either station, as indicated above, the variation in the line resistance could be made far greater than would actually occur in practice

with any line, without in the slightest degree interfering with the regularity of the signals and without even necessitating a fresh balance adjustment.

He also stated that an experimental trial which was instituted by him in October last between Allahabad and Calcutta was perfectly successful, in consequence of which the Director General of Telegraphs in India had decided to work one of the Calcutta-Bombay main lines by this method. At present the Resistance and Condenser arrangements for this purpose are under manufacture.

The paper will be published in full in Part II of the Journal.

The reading of the following paper was postponed.

Observations on some Indian and Burmese species of Trionyx. By W. THEOBALD, Esq.

The receipt of the following communication was announced.

First part of Ahom Alphabet and numerals to 200, by J. M. Foster, Esq., F. S. B., Assam.

LIBRARY.

The following additions have been made to the Library since the meeting held in January last.

Presentations.

* * * Names of Donors in Capitals.

The Quarterly Journal of the Geological Society, Vol. XXIX, Part 4, No. 116.

Mr. W. T. Blanford.—On the Nature and probable Origin of the Superficial Deposits in the Valleys and Deserts of Central Persia. *Professor Owen.*—On the Skull of a Denticulous Bird from the London Clay of Sheppey.

THE GEOLOGICAL SOCIETY OF LONDON.

The Journal of the Royal Geographical Society, Vol. 42.

Capt. R. F. Burton.—Notes on the Exploration of the Tulûl el Safî, the Volcanic Region east of Damascus and the Umm Nîrîn Cave. *Capt. S. B. Miles.*—On the neighbourhood of Bunder Marayah. *Capt. T. Blakiston.*—A Journey in Yezo. *E. D. Morgan.*—An Expedition through Manchuria from Pekin to Blagonestchek in 1870 by the Archimandrite Palladius, chief of the Russo-Greek Church Mission at Pekin. *Major T. G. Montgomerie.*—A Havildar's journey through Chitral to Faizabad in 1870. *Major B. Locett.*—Surveys on the Road from Shiraz to Bam. *Commander H. C. St. John.*—Notes on the East, North-east, and West coasts of Yezo. *Capt. J. P. Basevi.*—Account of the Island of Minicoy. *J. W. Barns.*—Notes on the Physical Geography of the Bhawalpur state. *R. F. Burton.*—Notes on a Reconnaissance of the Anti-Libanus. *J. Troup.*—Journal of a Tour through parts of the Provinces of Echigo, Echû, Kaga, and Noto, Japan, 1871. *A. Rattray.*—A visit to Fernando Noronha. *Col. H. Yule.*—Papers connected with the Upper Oxus Regions. *Sir H. C. Rawlinson.*—Monograph on the Oxus.

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

Catalogue of the Specimens of Hemiptera Heteroptera in the Collection of the British Museum, Part VIII, by F. Walker.

THE TRUSTEES OF THE BRITISH MUSEUM.

Journal Asiatique, No. 6, Août-Septembre, 1873.

M. Senart—Essai sur la légende du Buddha, son caractère et ses origines.

THE ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, Novembre, 1873.

Ali Suavi—A propos de la mer d'Aral.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Actes de la Société Linnéenne de Bordeaux, Tome VIII, Part 2nd.

THE LINNEAN SOCIETY OF BORDEAUX.

Zeitschrift der Deutschen Morgenländischen Gesellschaft, Bd. XXVII, Heft I.-II.

Th. Aufrecht—Ueber die Paddhati von Cārāgadhara.

THE GERMAN ORIENTAL SOCIETY, LEIPSIG.

Musée Botanique de Leide, par W. F. R. Suringar, Vol. I, Livr. 1-3.

Illustrations de la Flore de l'Archipel Indien, par F. A. W. Miquel, Tome 1er, Liv. 1-3.

THE ROYAL HERBARIUM AT LEYDEN.

General Report on the Operations of the Great Trigonometrical Survey of India during 1872-73, by Col. J. T. Walker, F. R. S.

THE SUPERINTENDENT OF THE G. T. SURVEY.

Review by the Chief Commissioner on Arboricultural operations in the Central Provinces for 1871-73.

The Central Provinces' Census, 1872.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Voyage on the Euphrates from Suklewieh to Muskench.

THE GOVERNMENT OF INDIA, FOREIGN DEPARTMENT.

Extracts from the Reports of the Trigonometrical, Topographical, and Revenue Surveys of India for 1871-72.

THE GOVERNMENT OF INDIA, A. R. C. DEPARTMENT.

Report on the Land Revenue Administration of the Lower Provinces for 1872-73.

Report on Vaccination in the province of Bengal, 1872-73, by Surgeon General J. C. Brown.

THE GOVERNMENT OF BENGAL.

The Bhagavat-gītā and the Bible, by Prananatha Pandita, B. A.

THE AUTHOR.

Results of Meteorological Observations made at Daba Gardens, Vizagapatam, by A. V. Nursingrow.

THE AUTHOR.

Morte de Yagindatta, episodio do Poema Epico-o Ramayana versos Portuguezes de candido de Figueiredo.

THE AUTHOR.

Observations on the Filtration of the Húgli Water for the Calcutta Water-Supply, by D. Waldie.

THE AUTHOR.

Microscopic Examinations of Air, by D. D. Cunningham, M. B.

THE AUTHOR.

The Christian Spectator, Vol. III, No. 31.

THE EDITOR.

Journal of Medicine, October, 1873.

THE EDITOR.

Nandini, Vol. VI, No. x.

THE EDITOR.

Bd. XIII.

THE EDITOR.

Museum Godeffroy, Heft 3. Andrew Garrett's Fische der
L. G. Günther, Heft I.

H. F. BLANFORD, ESQ.

Purchase.

London, Edinburgh and Dublin Philosophical Magazine, November, 1873.

Professor O. Reynolds—On the action of a Blast of Sand in Cutting Hard Materials
F. Löbner—On the Temperature and Physical Constitution of the Sun. *J. D. Dana*—
On some results of the Earth's Contraction from cooling, including a discussion on the
Origin of Mountains.

The Annals and Magazine of Natural History, November, 1873.

H. J. Carter—On the Hexactinellidae and Lithistidae generally and particularly on
the Aphrocallistidae, Aulodictyon and Farrea, together with facts elicited from their
deciduous structures and descriptions respectively of three new species. *R. Swinhoe*—
On three species of birds from Chefoo (N. China). *Dr. A. Günther*—On a collection of
Fishes from Chefoo (N. China). *H. W. Bates*—On the longicorn Coleoptera of Japan.
Dr. C. F. Lütken—On spontaneous division in the Echinodermata and other Radiata.

The Ibis, October, 1873.

R. Swinhoe—Notes on Chinese Ornithology. *Capt. J. Hayes Lloyd*—On the Birds
of the province of Kattywar in Western India.

The American Journal of Science, October, 1873.

Eug. W. Hilgard—On the Silt Analysis of Soils and Clays.

Revue et Magasin de Zoologie, Nos. 10-11, 1873.

Revue des Deux Mondes, 15th Oct. to 15 Nov., 1873.

Revue Archéologique, Octobre, 1873.

Journal des Savants, Octobre, 1873.

Comptes Rendus, Nos. 14-19, 1873.

No. 14. *M. L. Respighi*—Deuxième note sur la grandeur et les variations du
diamètre solaire. *M. Gimbert*—Assainissement des terrains marécageux par l'*Eucalyptus*
globulus.

No. 15. *M. C. Davaine*—Recherches relatives à l'action des substances dites *anti-septiques* sur le virus charbonneux. *M. H. Caron*—Note sur un nouveau mode de trempe de l'acier. Régénération du fer brûlé.

No. 18. *M. Th. du Moncel*—Note sur les meilleures dimensions à donner aux *aimants*. *M. F. G. Calvert*—De l'influence qu'exercent certains gaz sur la conservation des œufs.

No. 19. *M. Dumas*—Note sur l'action que le plomb exerce sur l'eau. *M. F. Lesseps*—Extrait d'une lettre à Lord Granville sur le projet d'un chemin de fer de l'Asie Centrale. *M. L. Colia*—Influence de l'eau employée en boisson du choléra. *M. Fordos*—Action de l'eau aérée sur le plomb, considérée sous le rapport de l'hygiène et de la médecine légale. *M. H. Tarry*—Procédé pour la diminution et la force du vent; suppression des girouettes; application aux machines à vapeur.

Reeve's *Conchologia Iconica*, Parts 306-307. *Helic*
arginuia. *Plicatula*. *Conathodon*.

Le Calendrier de Cordoue de l'année 961,—Texte
traduction Latine, publié par R. Dozy.

Die ehemalige Spracheinheit der Indogermanen Europas
geschichtliche Untersuchung von August Fick.

Studien über Indogermanisch-semitische Wurzelverwandtschaft
F. Delitzsch.

Wörterbuch zum Rig-Veda, von H. Grassmann, erste Lieferung.

The *Sāmavidhāna Brāhmaṇa*, edited by A. C. Burnell, Vol. I.

Five *Jātakas*, in the Original Pali Text, with a Translation and Notes,
by V. Fausbøll.

Apastambiya *Dhurma Sūtram*, edited, with a Translation and Notes,
by G. Bühler, Part I, containing the Text with critical Notes, and an Index
of the Sūtras.

Lectures on Light, by J. Tyndall, LL. D., F. R. S.

Heat, a Mode of Motion, by J. Tyndall.

Lectures on Sound, by J. Tyndall.

The Genesis of Species, by St. George Mivart.

The Descent of Man, and Selection in relation to Sex, by Charles Darwin, M. A., F. R. S.

The Expression of the Emotions in Man and Animals, by Charles Darwin.

The Beginnings of Life, by H. C. Bastian, M. D., F. R. S.*

The Depths of the Sea, by Prof. C. Wyville Thomson.

Pre-Historic Times, as illustrated by Ancient Remains, and the Manners
and Customs of Modern Savages, by Sir J. Lubbock, Bart.

Popular Lectures on Scientific Subjects, by H. Helmholtz.

Quarterly Journal of Microscopical Science, Vol. XIII.

A Comparative Grammar of the Modern Aryan Languages of India, by
J. Beames, B. C. S., Vol. 1., on Sounds.

Rude Stone Monuments in all Countries, their Age and Uses, by James Fergusson, D. C. L., F. R. S.

History of the Imáms and Sayyids of 'Omán, by Salil-ibn-Razik, from A. D. 601-1856, translated and edited by the Rev. G. P. Badger.

A General System of Botany, Descriptive and Analytical, by Emm. le Moine and J. Decaisne.

The Universe, or the Infinitely Great and the Infinitely Little, by F. A. Pouchet.

Physical Geography of the Globe, by Sir John F. W. Herschel, Bart.

A Reading Book of the Turkish Language, with Grammar, and Vocabulary, by W. B. Barker.

Etymologische Forschungen auf dem Gebiete der Indo-Germanischen Sprachen, von Professor Dr. Aug. F. Pott,—Wurzel-Wörterbuch der Indo-Germanischen Sprachen, Band IV and V.

Eränische Alterthumskunde, von F. Spiegel, Band 2. (Religion. Geschichte bis zum tode Alexanders des Grossen).

Vergleichende Grammatik der Indo-Germanischen Sprachen von R. Schlegel, Th. I. (Das Indo-Germanische Verbum nebst einer Uebersicht der einzelnen Indo-Germanischen Sprachen und ihrer Laut.-verhältnisse).

Indische Alterthumskunde, von C. Lassen, Band 2. (Geschichte von Buddha bis zu dem Ende der älteren Gupta-Dynastie. Nebst Umriss der kulturgeschichte dieses Zeitraums.)

Les Migrations des Peuples et particulièrement celles des Touraniens, par Ch. E. de Ujfalvy de Mezo-Kövesd.

A Dictionary of the English and Malabar Languages.

A Grammar of the Thai or Siamese Language, by Capt. J. Low.

Fauna Boreali-Americana, by J. Richardson.

Plantæ Javanicæ rariores, by T. Horsfield.

M. Milne Edward's Manual of Zoology, translated by Knox.

Schröder's Turkish Grammar.

Index to Vols. 1—50 of the Calcutta Review, by J. Furrell.

Indian Polity, a view of the System of Administration in India, by Lieut.-Col. George Chesney, R. E.

Haydn's Dictionary of Dates.

McCulloch's Geographical Dictionary, 2 vols.

Exchange.

Ocean Highways, No. 9, December 1873.

Nature, Nos. 215-218.

List of Sanskrit and other Manuscripts and lithographed works purchased for the Society.

1522. Pas'ubandha.

1523. Mahābhārata-tātparyya-nirnaya.

1524. { Púrva-mímánsártha-sangraha
or Laugákshi, by Laugákshi Bháskara.
1525. Akshara-chintámaṇi, by S'iva.
1526. Sávitra-chayana-prayoga.
1527. S'ruti-lakshana-prāyas'chitta.
1528. Kalpasāra-kārikā.
1529. S'as'isanā-kāvya, by Jagannátha Paṇḍita.
1530. Sañhitopanishad-vivarāṇa, by Sañkarāchārya.
1531. Muhúrta-chintámaṇi Tikā, by Nilakantha and Govindaji.
1532. Kumāratikā, Bīla-bodhini, by Navanítarāma.
1533. Sārasvat Stotra.
1534. Akshara-chintámaṇi, by S'iva.
1535. Bhagavadgítā, Mahārāshtri.
1536. S'rāddha-paddhati, by Raghunátha.
1537. Anandavinoda, by Kāmarāja Dikshita.
1538. Bhrigu-sañhitā.
1539. Savana-prayoga.
1540. Vyākhyāsudhá, Commentary on Amarakosha, by Bhāu Dikshita.
1541. Padma-purāna, Patālakhaṇḍa, by Vyāsa.
1542. Bhuvanes'vari-rahasya.
1543. Gapes'a-gítā.
1544. Kālī-stava-tīkā.
1545. Gaṇapati-s'ukta.
1546. Ratnamālī, by S'rīpati.
1547. Mahishotsarga-vidhi.
1548. Grihyāgni-sāra, by Nārāyana Bhaṭṭa Arada.
1549. S'rāddha-prayoga.
1550. Kālabhairava-sahasranāma.
1551. Mahākāla-sañhitā.
1552. Bālavidha, by Budha Mis'ra.
1553. S'iva-sañhitā.
1554. Nara-lakshana-s'āstra, by Durlabharāja.
1555. Prākṛit Grammar, by Mārkaṇḍeya.
1556. Kalki-Purāna.
1557. Gopāla-līlā-kāvya, by Rāmachandra Bhaṭṭa.
1558. Trikoṇamiti-tantra, by Bāpu Deva.
1559. Vārtika-pāṭha, by Govardhana Mis'ra.
1560. Aushadha-nāmāvalī.
1561. Vehulā-Nakindara, by Nilāmbara S'armā.
1562. Golā-prakāśa.
1563. Unādi-vṛitti, by Ujvala Datta.
1564. Yoga-chintámaṇi, by S'rīharsha Kīrti S'uri.

1565. Pañcha-bhūta-vādārtha, by Viṭṭhala S'āstri.
1566. Khaṇḍana-pariśiṣṭa, by Tārācharana Tarkaratna.
1567. Kalpa-latā.
1568. S'riddha-viveka, by Pindadhara.
1569. Achārādars'a, by S'riddatta.
1570. Vaidya-jivana-chikitsā satika, by Lolimbarāja.
1571. Prāyasc'hitta-kadamba-nirṇaya, by Gopālā Nyāyapañchānana.
1572. Garuḍa Purāṇa.
1573. Jātakāṅkārā satika, by Gaṇeś'a Suri.
1574. Hāyana-ratna, by Balabhadra.
1575. Purushottama-māhātmya, a part of the Virhannāradiya Purāṇa.
1576. Pratishṭhā mayūkha, by Nīlakanṭha.
1577. Vāda-sudhākara, by Kṛishṇa Achārya.
1578. Vaiyākaraṇa-siddhānta-manjushā, by Nāgeś'a.
1579. Rasamanjarī (Satika), by Bhānu Datta.
1580. S'aktivāda Ṭikā, by Gadādhara.
1581. Jātakābharaṇa, by Daivajña Dhundirāja.
1582. Kuvalayānanda, by Appyā Dikshita.
1583. Mantra-kaumudī, by Mahidhara.
1584. Praudhamanoramā, by Bhaṭṭoji Dikshita.
1585. Bhāsvatī Satika, by Mādhava Miś'ra.
1586. Ramalāmṛita.
1587. Vedastuti Satika, by Kās'īnātha Upādhyāya.
1588. S'ānti-mayūkha, by Nīlkanṭha.
1589. Navaratna, (Astronomy), by Parama Sukha.
1590. Vrata-rāja, by Daivajña S'armā.
1591. Sarvārtha-chintāmaṇi (Astronomy.)
1592. Uttarāvalī or Uttara pakshāvalī, by Praudha Paṇḍita.
1593. Purva-pakshāvalī, by Praudha Paṇḍita.
1594. Vyutpatti-vāda, by Gadādhara Bhaṭṭāchārya.
1595. Muhūrta-chintāmaṇi-satika, by Rāma Daivajña.
1596. Champu-bhārata, by Ananta Bhaṭṭa.
1597. Mahābhāshya, by Patanjali (Lithograph.)
1598. Pratishṭhā-mayūkha, by Nīlkanṭha.
1599. Yātaka-paddhati or Praudhamanoramā, by Keś'ava.
1600. Nṛisīṅha champu, by Bhaṭṭa Keś'ava.
1601. Sabdendu-s'ekhara-ṭikā, by Sadās'iva Bhaṭṭa.
1602. Alaṅkāra-s'ekhara, by Keś'ava Miś'ra.
1603. Sāhityasāra satika, by Achyuta S'armā, Commentary by Nārēyaṇa S'armā.
1604. Viś'va-karma-prakās'a.
1605. Laghu-sabdendu-s'ekhara, by Nāgeś'a Bhaṭṭa.

1606. Sarvārtha-chintāmani, by Vyankata S'armā.
1607. Sūdra-kamalākara, or S'ūdra-dharmā-tattva, by Kamalākara Bhaṭṭa.
1608. Prāyas'chittendus'ekhara, by Kās'īnātha Upādhyāya.
1609. Brihat-pārās'ara-smṛiti, by Parāsara.
1610. Brihaj-jātaka-saṭika, by Bhaṭṭotpala.
1611. Achārārka, by Divākara Bhaṭṭa.
1612. Sañskāra-kaustubha, by Annanta Deva.
1613. Brahmottarakhaṇḍa.
1614. Vihāri-s'atsai, by Vihārilāla (lithograph.)
1615. Dharma-sindhu-sāra, by Kāsīnātha Upādhyāya.
1616. Siddhānta-kaumudī, with the commentary called Tattvabodhini, by
Jñānendra Sarasvatī.
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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MARCH, 1874.

The monthly general meeting of the Asiatic Society of Bengal was held on Wednesday, the 4th instant, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From W. F. Blanford, Esq., *Journal des Museum Godeffroy*, Part III, containing A. Garrett's *South Sea Fishes*, Part I, edited by Dr. A. C. Günther.

2. From His Highness the Mahārājā of Bardwān, a copy of the *Mahābhārata*, *Salya*, *Souptika* or *Striparvas*, in Bengali and Sanskrit.

3. From the Author, a copy of a *Vocabulary of dialects spoken in the Nicobar and Andaman Isles*, by Fr. Ad. de Röepstorff.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected Ordinary Members—

A. C. Lyall, Esq., C. S.

A. Crombie, Esq., M. D.

R. Brown, Esq., M. D.

C. A. Wood, Esq.

Commander A. D. Taylor.

J. H. Haworth, Esq.

The following are candidates for ballot at the next meeting—

W. D. Bruce, Esq., C. E., Calcutta, proposed by Captain J. Waterhouse, seconded by Col. H. Hyde, R. E.

James Kimber, Esq., C. E., Midnapūr, proposed by G. Nevill, Esq., seconded by P. Dejeux, Esq.

The Council reported that they recommend the Rev. Fr. E. Lafont, S. J., for election as an Associate Member of the Society on the grounds of his well known scientific attainments.

The President reported that the Council have nominated the following gentlemen to serve on the several Committees during the current year—

Sub-Committee of Finance.

Bábu Rájendralála Mitra.	Dr. S. B. Partridge.
L. Schwendler, Esq.	J. Geoghegan, Esq.

Library.

The Hon'ble J. B. Phear.	L. Schwendler, Esq.
Babu Rájendralála Mitra.	J. Geoghegan, Esq.
The Hon'ble E. C. Bayley, C. S. I.	W. S. Atkinson, Esq.
W. L. Heeley, Esq.	Dr. S. B. Partridge.
G. Nevill, Esq.	C. H. Tawney, Esq.
A. Pedler, Esq.	Whitley Stokes, Esq.
Dr. Mahendralal Sircar.	G. W. Barclay, Esq.

Philology.

The Hon'ble E. C. Bayley, C. S. I.	The Rev. K. M. Banerjea.
Bábu Rájendralála Mitra.	Babu Gour Doss Bysack.
W. L. Heeley, Esq.	Dr. Mahendralal Sircar.
C. H. Tawney, Esq.	Moulavi Abdul Latif Khan Bahadur.
General A. Cunningham, C. S. I.	„ Kabiruddin Ahmad Sahib.
J. Beames, Esq.	Bábu Dijendra Nath Tagore.
F. S. Growse, Esq.	Whitley Stokes, Esq.

Natural History.

Dr. J. Ewart.	Dr. S. B. Partridge.
W. S. Atkinson, Esq.	L. G. King, Esq., M. D.
L. Schwendler, Esq.	T. R. Lewis, Esq., M. B.
G. Nevill, Esq.	D. D. Cunningham, Esq., M. B.
H. F. Blanford, Esq.	Dr. W. Schlieh.
V. Ball, Esq.	W. Theobald, Esq.
H. B. Medlicott, Esq.	W. E. Brooks, Esq.
D. Waldie, Esq.	S. E. Peal, Esq.
A. O. Hume, Esq., C. B.	S. Kurz, Esq.

Physical Science.

His Excellency Lord Napier of Magdala.	A. Pedler, Esq.
Col. H. L. Thuillier, C. S. I.	R. S. Brough, Esq.
The Hon'ble J. B. Phear.	D. D. Cunningham, Esq., M. B.
H. B. Medlicott, Esq.	T. R. Lewis, Esq., M. B.
Dr. S. B. Partridge.	A. Tween, Esq.
H. F. Blanford, Esq.	W. Theobald, Esq.
D. Waldie, Esq.	W. G. Willson, Esq., B. A.
L. Schwendler, Esq.	A. Cappel, Esq.

Coins.

The Hon'ble E. C. Bayley, C. S. I. Major F. W. Stubbs.

Bābu Rājendralāla Mitra.

Rev. M. A. Sherring.

General A. Cunningham, C. S. I.

The Committee of Papers.

The Members of Council.

Mr. Blochmann exhibited rubbings of the following inscriptions received from Genl. Cunningham and Mr. Delmerick.

I'rich or Erich.

Irich lies N. E. of Jhānsi, near the right bank of the Betmā, N. W. Provinces.

Parganah Irich is mentioned in the *Āin i Akbari* as the chief parganah of Sirkar Irich, *Qūbah Agra*, and is said to have contained 625,597 big'has, assessed at 2,922,436 *dāms*. Its inhabitants are Kāyasths. In the beginning of Shāhjahān's reign, it belonged to Sirkār Islāmābād, to which also Bhānder and Panwāri belonged. The last two parganahs are counted in the *Āin* to Sirkār Irich.

Irich was in the possession of Bundelā chiefs. In the end of Akbar's reign, a Bundelā chief, a murderer, was besieged in Irich (*Āin-i-Akbari*). In the beginning of Shāhjahān's reign, it was conquered by Bir Singh's son; and not long after, it was in the hands of the Mughals in their engagements with Khān Jahān Lodi. In 1052 A. H. (1642), the places of Sirkār-Islāmābād were given as jagīr to S. Jāhāngīr, son of S. Mahmūd Bārha (*Āin-i-Akbari*). Shajā'at Khān died at Irich in Shawwāl of the year 1083 (1672-3). During the reign of Aurangzīb, we find that Manúchihir was Faujdār of Irich; he died in the end of 1083 A. H. (1673). In 1104 (A. D. 1692-93), Odat Singh, zamindār of Irich, is mentioned as Faujdār of Irich.

General Cunningham's rubbing refers to the building of a mosque in Irich, which was completed during the reign of Mahmūd Shāh of Dihli on the 4th Rajab, 815 A. H., or 10th October, 1412, A. D. The inscription contains a short poem of ten lines (metre, long *ramal*); but three-fourths of left portion of the stone are illegible. The builder of the mosque was Qāzi Ziyāuddin, apparently a brother of Junaid, the imperial jagīrdār of Irich.

The following is all that I can decipher; fortunately the date and the name of the king are quite clear.*

* The use of *ke* instead of *kīh* is archaic. Regarding the form *hīzād* for *hashtzād*, vide Proceedings, Decr. 1873, p. 291.

در همایون نوبت فرمانده کشور ستان * محمود
 آن جهانگیر کے بہر عز اسلام از نیام * میکشد تیغ
 باد یا رب دایما در ملک گیتی ذات شاہ * چون سکندر کامگار و چون
 والی اقطاع ایرج خان لشکرکش جنید * کز علومنزات برچرخ
 ہم برادر ہم مدار ملک و ہم دستور شاہ * ہم پناہ دولت و ہم
 نو بنا فرمود این خیبر معظم * با چنین گنبد کے در عالم
 کرد فرمایش درین قاضی ضیا الدین کے او * هست خان مملکت
 شد بناء چون بود بر جمعہ چہارم از رجب * سال هیصد پانزدہ از ہجرت
 از براے نظم این لولو مبارک بندہ *
 *

1. In the auspicious reign of the country-taking ruler, ... M a h m ū d.....
2. The taker of worlds, who for the honor of Islām draws the sword from the scabbard.....
3. O Lord, may the qualities of the king endure for ever in the kingdom of the world! May he be successful like Alexander, and.....
4. The possessor of the jāgīr (aqṭā') of Irich, the elevation of whose rank up to the heaven.....
5. The brother as well as the pivot of the king's world, the vizir of the Emperor, the refuge of power.....
6. Ordered this noble religious edifice to be built in the world.....
7. The order for it was given by Qāzī Ziyā al-Dīn, the vizir of the kingdom,...
8. The building was (completed) when it was 815 A. H.....
9. For the stringing of this (poetical) pearl the slave Mubārak.....
10. (Illegible).

Piparai, near 'I'sa'garh.

The following two inscriptions were found by General Cunningham on an old mosque and on a well at Piparai, near 'I'sa'garh. They refer to the building of mosques during the reign of Mahmūd Shāh Khiljī of Mālwa (A. D. 1435 to 1482). In the well inscription, the Persian is followed by nine lines of Hindī (illegible). Although the inscriptions mention the years 855 and 884, they look as if they had been written at the same time; for not only are the characters the same, but the phrases used in the one occur in the other. The style is very bad; the lines have different metres, and several have no metre at all. The author, indeed, says that he gives as good a specimen of the speech of the learned as he can give; but his rhymes are the only doggerel verses that I have hitherto seen in inscriptions.

1.

بسم الله الرحمن الرحيم

بعهد دولت محمود شه عادل زمان * مشهور روشن در شجاعت در جهان
یافت توفیق این مساجد را بنان * ملک بود دایم کارهایش در امان
از برای رحمت حق کرده است * چون بیاید روز محشر اجر آن
کارها هم نیک مشروع میکند * تا در آید فوج احمد در جهان
بقدر وسع امکان گفتند ام * از کلام فاضلان دادم نشان
سلیمان کم سخن گفتن چه داند * مگر می باید قلم راندن دران
سال هجرت هیصد و پنجاه پنج * شانزده بد صفر کردم بیان

In the name of God, the merciful and the clement !

1. In the time of the reign of Mahmūd Shāh, the just one of the age, who is well known in the world for his bravery,
2. He (?) found grace to build these mosques. The kingdom will last long, his deeds (are done) in faith.
3. He has done (so) on account of God's mercy, because on the day of resurrection he will find his reward.
4. The deeds he performs are also good and allowed by law, so that the army of the Prophet enters paradise (?).
5. I have spoken according to the breadth of human power, of the speech of the learned I have given a sign.
6. What does Solomon know when he speaks little? He should rather have composed writings.
7. The year of the Hijrah is 855, and it was the 16th Ġafar. I have given the explanation. [20th March, 1451.]

2.

بعهد دولت پادشاه محمود نادر زمان * باد او غازی در شجاعت .. (؟)
شرفخان بن ملو خان عادل بدوران * که او ..
ملک سعید شد که دایم کارهایش در امان * یافت توفیق ..
کارها هم نیک صالح میکند * تا در آید با محمود در جهان
سال هجرت هیصد و هشتاد چهار * بیست پنجم ماه شوال روز دوشنبه اتمام او

1. In the time of the reign of Mahmūd Shāh, the distinguished one of the age, (unintelligible),
2. Sharaf Khān, son of Mallū Khān, the just one in the time, who.....
3. The kingdom is pleasant, for his deeds are for ever (performed) in the faith; he found grace to build it.
4. The deeds he performs are also good and pious, so that he may go with Muhammad into Paradise.
5. The year of the Hijrah is 884, on Monday the 25th Shawwāl it was completed. [9th January, 1480.]

Here follow several illegible lines in Hindi.

Abúhar and Sirsá'.

Mr. J. G. Delmerick some time ago forwarded to the Society two stones. One was found among the débris of the old fort of Abúhar in the Sirsá District, Dihlí. The inscription is in excellent preservation; it seems to have been put up some time after the erection of the edifice itself, when the exact date of the building had been forgotten. The characters resemble the characters of inscriptions of the Tughluq period.

تجدید عمارت هذه البيت في أيام دوات سلطان السلاطين شمس الدنيا والدين
التمش السلطان نصير امير المومنين في ثوبت ايلة الملك المرحوم قتلغ خان
ابيك في شهر سنه نيف وثلثين وستمائة ۱۱

The renovation of this edifice (took place) during the time of the reign of the king of kings Shamsuddunyá waddín Ilitimish, the king, the helper of the Commander of the faithful, and in the time of the governorship of the late Qutluq Khán Aibak. In the year six hundred and thirty-odd. [A. D. 1232-1242.]

The other stone was found in the Fort of Sirsá, and contains a Persian poem of seven lines. The first, fifth, and ninth hemistichs are wanting, one-fourth of the stone on the right hand having been cut off. Though the inscription is incomplete, it is clear that it refers to the erection of a house, built by Muhammad Sháh in 732 A. H., in order to please the spirit of Tughluq Sháh, the martyr, whose death, if we could trust Ibn Baṭūṭah, he had caused by the breaking down of a state pavilion. That Muhammad Sháh was anxious to appease the manes of his uncle, is also clear from his coins.*

... .. * سلطان بر و بحر محمد شه شهان
بهر ثبات مملكت اين خانه شد تمام * ميمون مباركست درين منزل اين مقام
... .. * تا خود رود بشغله از سمت شهر راه
از صدقه خليفه نزولش بود درين * روح شهيد تغلق شه شاد دل بدین
... .. * اشكار را قدر فصيح
از مال ملك خویش بگردست اين بنا * قصر زبرجدیش بچنه دهد خدا
تاريخ از جماد الاول نهم بدان * از سنه هفتصد و سی و دوشد نشان

- 1.....the Sultán of land and sea, Muhammad, the king of kings.
2. For the sake of the stability of the kingdom this house was completed; this place is lucky and auspicious at this stage.
- 3.....in order that he may himself go for some business from the direction...
4. From sincerity to the Khalifah [Tughluq Sháh], he [Muhammad Sháh] shall alight in this place: the spirit of Tughluq Sháh, the martyr, is here happy.

* *Vide* Thomas, *Chronicles*, pp. 212, 213. In the legends of Muhammad Tughluq's coins read *الراجی برحمه* (pp. 209, 213, 214, 216); *محيى*, p. 211; and *برهان*, p. 212.

5. (Broken, and the second hemistich is unintelligible.)
6. He built this edifice from the taxes of his kingdom. God will give him an emerald castle in Paradise.
7. Know that the date is the 9th Jumáda I, 732 [7th February, 1332.]

Col. Hyde exhibited two specimens of iron as remarkable examples of the change that takes place in the structure of wrought iron when submitted to long and continued concussion or strain, and he explained that the first section was one face of the fracture of the piston-rod of a steam-hammer, that had been in use some seven years.

The rod, which was 5" in diameter, broke off suddenly while the hammer was at work. The fracture is sharp and perfectly crystalline in many places exhibiting faces, measuring $\frac{1}{2}$ of an inch.

The other face of the fracture, which he also placed on the table, had been heated and cut, so as to prepare the rod for the new end to be welded on, and from it would be seen that this operation had, when the hammer had been applied, entirely restored the original structure of the iron.

The second example was a small piece from the fracture of one of the rods of an hydraulic press that had been at work for some 25 years in a bullet machine, and its structure was even more remarkably crystalline than that of the steam-hammer piston.

Col. Hyde remarked that though it was perfectly well known that heat and vibration produced this change in the structure of iron (as he had daily experience in the Mint machinery), he was not well established, that the same change was produced by the work in iron in the position of a rod in an hydraulic press, and that in two examples on the table, the same result had been produced by repeated and violent concussion end on for some seven years; in the other by repeated but gradual tension end on for some twenty-five years.

Mr. Schwendler remarked that the two pieces of crystallized wrought iron exhibited by the President were most perfect specimens, and added that it would be interesting to know if this crystalline state of the iron supervenes suddenly or is only arrived at gradually, he himself was inclined to believe the former to be the case, since it can scarcely be admitted that there is any intermediate state between the amorphous and the crystalline condition of the same body.

Dr. Waldie could not concur with Mr. Schwendler inasmuch as there were many gradations between the non-crystalline and crystalline states of bodies, and that pieces of wrought iron which had been subjected for different lengths of time to crystallizing influences exhibited different degrees of crystallization.

Mr. Schwendler said that the fact advanced by Dr. Waldie did not contradict his hypothesis, for he did not deny the existence of different states of crystallization of different pieces of iron, but contended that the transition from the amorphous to the crystalline state in any one piece of iron was *per saltum* and permanent in character.

Mr. Schwendler exhibited a crow's nest made with bits of thin telegraph wire, which had been most ingeniously adapted to the purpose. He said that nests of this kind had on several occasions been found on the buildings in, and on the trees near, the Telegraph Store Yard.

So long as the crows used only waste Government material to increase the stability of their nests, and were content to build them on trees and houses, he had not the slightest objection to make; but, when they came to use the Telegraph wires and posts to support these metal structures, their advance in the arts assumed a highly objectionable form from a telegraphic point of view. For such nests would invariably cause what are technically called "earths" and "contacts," and thereby interfere with Telegraph communication. In Calcutta, on the large terminal post near the signal office, nests of this kind had been found, chiefly made with soda-water bottle wire.

On the whole, however, it was satisfactory to see an endeavour on the part of the crows to improve the fabric of their dwellings. In this respect they might be taken as an example by the majority of the natives in the construction and arrangement of their houses. Much might be learned by the introduction of Western civilization into the East. A stroll through any of the bazars would shew the observer.

Crows, however, were not, Mr. Schwendler observed, the only animals who, by their domestic or other arrangements, interfered frequently with Telegraph communication. Wasps building their mud nests in the cups of the insulators, and birds of prey dropping dead fish, snakes and offal on the wires were all frequent causes of interruption.

In addition to the above, the exposure of overland lines to climatic influences, to atmospheric electricity,* and to danger during times of war, all pointed to the great advantages that would be derived from the use of under-ground wires, the difficulties to the introduction of which had, he believed, been much exaggerated. To secure regular telegraph communication through all countries in the future, subterraneous lines were required, and when the want had become strongly felt, the technical difficulties (on account of insulation and retardation) would be overcome.

* On one occasion in Calcutta, 16 insulators were broken by a single flash of lightning.

The following papers were read—

1. *Observations on some Indian and Burmese species of Trionyx*.—By W. THEOBALD, Esq.

My attention having lately been attracted by certain erroneous statements by Dr. J. E. Gray in the Supplement to the Catalogue of Shield Reptiles, dated 1870, and in the Appendix to the same work, dated 1872, and in several papers likewise in those widely circulated works, the Annals and Magazine of Natural History, and the Proceedings of the Zoological Society of London for the years 1869, 1870, 1871, and 1872, I feel myself reluctantly compelled to come forward with a correction of them, in simple self-justification, no less than in the cause of scientific accuracy and truth, since no one is, in some respects, so well qualified to do so as myself, who collected many of the specimens to which I shall have to refer, and who am therefore in a measure responsible for any glaring error in the recorded distribution or *habitat* of a species, which I knowingly permit to remain uncorrected, when published on my authority. The tone of many of Dr. Gray's remarks is such as to render this a most unwelcome labour, but I shall endeavour to keep as closely as possible to facts which any one can verify, and I confidently appeal to the indulgent consideration of those who, from personal acquaintance, best understand the difficulty which surrounds the subject, and the great disadvantage under which a colonial naturalist is placed, when he is obliged to impugn the *dictum* and scientific utterances of such an authority as Dr. J. E. Gray.

I would direct attention to, as essential to the right understanding of the synonymy of the group, is the question what *Trionyx gangeticus*, B. H., really is. Is *hurum* a mere synonym of *Tr. gangeticus*, or is it still available to designate a species hitherto confounded with the last?

In the course of the present paper I shall develop my own views on this point, but first of all I shall advert to the views of Dr. Gray and Dr. Anderson, as recorded so late as 1872.

Trionyx (Testudo) hurum is a name applied by Buchanan Hamilton to a Gangetic species, the drawing of which was copied by Gray in his Illustrations of Indian Zoology in 1829. The word has no specific application that I can discover, to any one in particular of our Gangetic species, but is merely the ordinary word signifying "forbidden" (as food, that is) to Mahomedans, to whom all turtle are "unclean," and is more familiar to English eyes as *haram*, the "forbidden" apartments of women in the East. In Dr. Gray's Catalogue of Tortoises, Crocodiles, and Amphisbœnians, dated 1844, page 47, and again in his elaborate Catalogue of Shield Reptiles, dated 1855, *Tr. hurum* stands as a synonym of *Tr. gangeticus*, Cuv., and neither in the Supplement to that work, dated 1870, nor the Appendix, dated May 1872, does this same *Hurum* appear as a recognised species. Till the remarkable date then of May 1872, Dr. J. E. Gray must be held to have recognised *Tr. hurum* as a mere synonym of *Tr. gangeticus*, Cuv.

In May 1872, Dr. J. Anderson, Curator of the Imperial Museum at Calcutta, published a brief but very important paper, almost wholly devoted to pointing out the specific distinction between *Tr. hurum*, B. H., and of Gray's Illustrations and *Tr. gangeticus*, Cuv., of which it had hitherto ranked as a synonym. Also that *Tr. ocellatus*, Gray, is a synonym of *Tr. hurum*, B. H. *apud* Anderson, and not of *Tr. gangeticus*, Cuv., as classed by Gray; and that *Tr. javanicus* of Gray's Illustrations is a synonym merely of *Tr. gangeticus*, Cuv.

In the next number of the Annals and Magazine for June 1872, Dr. Gray publishes a criticism of Dr. Anderson's paper, containing the following statement respecting it:—"Here in 1872 we just have what Dr. Buchanan Hamilton did at the end of the eighteenth century, and what I did in the Synopsis of the Reptiles published in 1831." This is so far true that doubtless Buchanan Hamilton considered *Tr. hurum* a good species when he made his drawing, and so may Dr. Gray when he published *Tr. hurum* in 1829, but I fail to see how that invalidates the fact that, on this point, Dr. Gray must have changed his mind at the date of publication of his first catalogue in 1844, and his second catalogue of Shield Reptiles in 1855, where he sinks *hurum* to the rank of a synonym only, and where it so remained till the appearance of Dr. Anderson's paper, that is to say, if we may assume Dr. Gray's views to be represented in the above words by his name.

In the November number of the Annals and Magazine of Natural History for 1872, Dr. Gray publishes a paper on the "Reptiles of India," and here for the first time that I can discover since the publication of his catalogue of Shield Reptiles does Dr. Gray record *Tr. hurum* as an independent species, and strange to say, Dr. Anderson, who so shortly before had elaborated this view *de novo*, is not anywhere mentioned. Comment on this is needless.

An important question now arises whether the conclusions arrived at by Dr. Anderson in the above paper, and adopted by Dr. Gray, are sound? Dr. Anderson is lucid and concise in his statements, but they are so startling that I shall give a brief quotation. Speaking of the young of *Tr. gangeticus*, Dr. Anderson remarks:—"Young individuals with these characters have greenish olive shells, vermiculated with fine black lines; and of the large series of specimens that has come under my observation, not one has presented any trace of ocelli." On the other hand, *Tr. hurum*, as Dr. Anderson would restrict it, usually possesses four ocelli in the young state "with the yellow spot on the temporal region, and another at the angle of the mouth with a yellow band across the snout," &c. Now, without pretending to anything like the experience which Dr. Anderson possesses, or the great resources at his disposal, I greatly question, or rather altogether distrust,

the above generalization. Not long since I received a living *Trionyx* which fairly corresponded outwardly with the figure of *Tr. hurum* in Gray's Illustrations. This specimen, when prepared, proved (by its skull) to be a true *Tr. gangeticus*. I then prepared (no specimens existing for comparison in the Imperial Museum) the skull of a small *Trionyx* I had in spirit in the precise livery of *Tr. ocellatus*, Gray, and this likewise afforded a skull which I should decidedly identify as that of *Tr. gangeticus*.

The mandibular symphysis was longer in proportion than in the adult, and in this character it approached the species indicated by Anderson as *Tr. hurum*, but the convex profile was quite that of *Tr. gangeticus*. The proportionate length of the head, too, anterior to and posterior to the front rim of the orbit, measuring to the nasal bones, was that of *Tr. gangeticus*; in *gangeticus* the proportion being 1 to 7.70; in *Tr. stellatus*, 1 to 5.90; in the young specimen of *Tr. ocellatus* type, 1 to 7.20. It is moreover incredible to me that all the ocellated specimens one sees should belong to *Tr. hurum*, assuredly a rare species, adult in Bengal, and I think therefore that Dr. Anderson has entirely misunderstood the question, and whilst correct in separating the species he terms *Tr. hurum* from *Tr. gangeticus*, he is in error as to the differences whereby he distinguishes them, in the young state, and ocellated livery.

What I believe to be the case is this:—We have in Bengal an extremely abundant and rather variable species, *Tr. gangeticus*, Cuv., some of the varieties of which have been considered as distinct species by Gray and others, two of which have lately been re-established under the old name of *Tr. hurum* by Dr. Anderson followed by Dr. Gray as described above. In addition to these better known varieties, there is, very rarely met with in Bengal, a second species, confounded by Dr. Anderson with the two so-called species *Tr. hurum*, Gray, and *Tr. ocellatus*, Gray, the whole being united under the name *Tr. hurum*, Gray, *apud* Anderson. To this I shall revert presently, but I here give the synonymy of *Tr. gangeticus*, Cuv., in accordance with the above view:

TR. GANGETICUS, CUV.

Tr. (Testudo) hurum, Buch. Ham., MSS.

Tr. (Testudo) gatajhal, Buch. Ham., MSS.

Tr. hurum, Gray, Ill. I. Z.

Tr. ocellatus, Gray, Ill. I. Z.

Tr. hurum, Gray, Ann. Mag. N. H., Nov. 1872, 331 in part.

Tr. hurum, Anderson, Ann. Mag. N. H., May 1872, in part.

This is the common *Trionyx* of Lower Bengal, and though variable in its markings may be always distinguished from the next by possessing in some form or other the dark streaks and lines on the head at all ages, which the other never does. At page 85 of the Annals and Magazine of Natural

History for 1871, Dr. Gray commits a serious error in stating that this species never exhibits the "semicircular bone in the front of the sternum, covered with a lunate callosity," for such will, I think, be found in all aged specimens of *Tr. gangeticus*, though not developed till the animal has nearly attained its full size. Dr. Gray's views seem in this matter to run in extremes. In his Catalogue of Tortoises, &c., dated 1844, at page 46, he writes:—"The sternal callosities appear and increase in size as the animal increases in age, hence they do not afford specific, much less generic, characters." So far from this being the case, the characters of the osseous plates of the sternum would seem to be one of our best means for diagnosing the different species of *Trionychidæ*, without accepting the later view of Dr. Gray and making them of generic value, by strictly following which method we should risk placing the young animal in one genus, the mature animal in another, and the aged and patriarchal member of his race, in a third!

This lunate callosity is also found in *Tr. Phayrei*, Th., and equally well developed in the species identified by Dr. Anderson as *Tr. hurum*. This is well exemplified in the skeleton of a superb male in the Imperial Museum and in a more completely ossified sternum referred by me to this species in my own possession, this last sternum measuring 15 inches, with a lunate callosity two and a half inches across. The fact is, this fifth lunate callosity is one of the generic characters in *Trionyx* in its perfectly adult state, and sex may perhaps influence the size the lunate plate may assume. It therefore serve, as it has been made to do, in its nascent state, before the union of the two osculant patches of the immature animal, as a generic character of *Landemania* or any other genus.

The second species alluded to above is represented in the Imperial Museum by a stuffed female, half grown, the skull and sternum of which are mounted for examination, and the superb skeleton of a male, fully adult, with a sternum of 15 inches. This fine species seems to have been quite overlooked or confounded with *Tr. hurum*, which, as I have shown above, is a synonym of *Tr. gangeticus*, Cuv., and as it is requisite to bestow a name on it, I propose terming it *Tr. Buchanani*, n. sp., with the following synonymy:—

Tr. BUCHANANI, n. sp.

Tr. hurum Auctorum in part.

I am not prepared to say wherein it differs externally from *Tr. gangeticus*, Cuv., but it may be at once distinguished most easily by its skull, which is more taper, and by the mandible possessing a median groove inside, quite different from the same bone in *gangeticus*. It is closely allied to *Tr. stellatus*, Geoff., but differs in having a slightly narrower head behind, and less pointed one in front, and by the median mandibular groove, for in *Tr. stellatus*, in place of a groove, there is

a well-marked median ridge. This point will alone suffice to discriminate the two species without a description of the soft parts, which I have no materials for giving. I of course do not regard it yet as *satisfactorily established*, that, according to Dr. Anderson, every ocellated *Trionyx* in Bengal belongs to this species, but should this fact be established, it will form an external mark for diagnosing between young individuals.

The third species of this paper is *Tr. stellatus*, Geoff.

I have myself a single specimen procured at Moulmein, of which I give a figure reduced to one-third of the natural size, and figures of the head of the full natural size. This species possesses none of the dark marks on the head seen in *Tr. gangeticus*, or described by Günther as met with in *Tr. javanicus*, though that author cautiously adds:—"The characteristic markings of the head of the continental specimens are not mentioned in descriptions of Javan individuals, so that both may be specifically different."—*Gunther's Reptiles, Br. India*, p. 48.

The plates of the species here given may enable others to determine the species more satisfactorily, but as far as the materials and books of reference at my command enable me to judge, I am inclined to refer it to *Tr. stellatus*, Geoff., a head of which is figured in the *Fauna Japonica*, published in 1833.

TR. STELLATUS, var Javan, Geoff., S. H. Siebold, *Faun. Jap. Chel.*

Tab V. f. 6.

Tr. javanicus, Schw., *apud Gunther*, in part, not *Tr. javanicus*, Gray.

Tr. peguensis, Gray, *Supp. Cat. S. R.*, p. 90.

Tr. hurum, Gray, *Ann. Mag. N. H.*, 1872, p. 366, as *Tr. Phayrei*.

Skull of an adult, *apud Gray*, *P. Z. S.*, 1869, p. 217.

"*Leik-kway*" of the Burmese.

I was at first much inclined to unite this species with the last, but they are, I am convinced, distinct, as all other differences apart, the shape of the head and the mandibular ridge in the one being represented by a mandibular furrow in the other, are characters sufficient to establish their distinctness. The dorsal disk too of *Tr. Buchanani*, Th., would seem to be much smoother than in *Tr. stellatus*, and less furnished with tubercles or warts, (if furnished at all) a point that can hardly be judged from a half grown and fully adult specimen.

The skull mentioned without name in the Proceedings of Zoological Society, and subsequently described by Dr. Gray as *Tr. peguensis*, belonged to an animal taken by a fish hook from the Sittoung river at Tonghoo, and has probably outgrown the spotted stage figured in the *Fauna Japonica*. During life, the Moulmein specimen displayed yellow-coloured spots, but the yellow gradually fades after immersion in spirit, and hence is not mentioned in descriptions, or rather described as white.

I now come to the consideration of a species which would seem to be

much commoner than the last in Burmah, but most rare, if not altogether wanting, in India. I give what I believe the the synonymy of this species, and must premise that in this case, as in the others, I have not attempted to evolve the less obvious synonyms, as mere speculations, without access to original figures, descriptions, or specimens, are of little value.

Tr. CARINIFERUS, Gray, Cat. Shield Rep., p. 67, Plate XXXII.

Tr. javanicus, Schw., apud Gunther, in part.

Tr. Phayrei, Theob., Jour. Latin Soc. Zool., Vol. X.

Tr. jeudi, Gray, Proc. Zool. Soc., 1869, p. 217.

Tr. formosus, Gray, Proc. Zool. Soc., 1869, p. 217.

Tr. Phayrei, Theob., apud Anderson, Proc. Zool. Soc., 1871, p. 154.

Leik. beywoon, of the Burmese.

The type specimen was obtained alive by myself in the Arakan range, west of Pegu, the dried shell being presented by me to the Bristol Museum, and the skull to the British Museum. The history of this skull I must now endeavour to unravel, not less successfully, let me hope, than I did in the case of *Testudo* (*Scaphia*) *Falconeri*, which, thanks to my observation thereon, has now been restored by the Trustees of the British Museum to the Imperial Museum, Calcutta. Vide Appendix to Catalogue of Shield Reptiles, 1872, p. 10, *et ante*. In the first place, I may state, as a matter of fact, that but two skulls (exclusive of young animals in spirit) of *Trionyx* passed from my hands into Dr. Gray's, either by gift or purchase, from the simple fact that I only brought home two from Burmah with me, *viz.*, 1st, a head of *Tr. stellatus*, as mentioned above, which Dr. Gray refers to *Tr. hurum* in his paper on the Mud Tortoises of India, in the Annals for 1872, p. 336, and probably alludes to without naming as "skull of an adult" in the Proceedings of Zoological Society, 1869, p. 217; and, 2nd, the skull of my type of *Tr. Phayrei*, presented by me to the British Museum in 1868 (or 67), which Dr. Gray doubtfully refers to *Tr. hurum* (erroneously as I believe), and which he also indentifies (correctly no doubt) with his *Tr. jeudi*. How comes it then I may ask that; with the type skull of my *Tr. Phayrei*, furnished him by myself, he describes another specimen as *Tr. jeudi*? In courtesy, and to avoid confusion and multiplication of names, Dr. Gray should have given such amended characters as he chose, but without altering the name of my type already published in the Journal of the Linnean Society. It is true Dr. Gray remarks (Annals and Magazine of Natural History, 1872, p. 336) of my type skull:—"It certainly is not the skull of the species described under that name in the Journal of the Linnean Society, nor of the Tortoise described under that name by Dr. Anderson." To this I can only say that till Dr. Gray gives some reasonable ground for this statement, I must be allowed to say that I believe it is; and this I say, knowing what my own type was like,

having moreover examined Dr. Anderson's aged individual, and with the skull of the individual figured in this paper, before me to compare with Dr. Gray's figure of the skull of *Tr. jeudi*. Dr. Anderson, moreover, having compared the skull of his specimen with Dr. Gray's type of *Tr. jeudi*, equally with myself, holds them to be identical, to which catena of testimony Dr. Gray opposes an assertion seemingly based on no substantial ground whatever.

In the Annals and Magazine of Natural History, 1871, p. 85, Dr. Gray refers Dr. Anderson's large specimen of *Tr. Phayrei* to the shadowy genus *Landemania*. But as I have shown that the sternal callosities of *Tr. gangeticus*, Cuv., when aged, really correspond with those of *Landemania*, it is hardly possible to maintain the independent existence of such a mere shred of a genus as the amended character of *Trionyx* would reduce it to; whilst a mere comparison of the species here given, with Gray's figure of *Tr. perocellatus*, Catalogue of Shield Reptiles, p. xxxi, will at once show how distinct *Tr. Phayrei*, Th., is from *Tr. perocellatus*, to which Dr. Gray is inclined to refer it.

A careful study, however, of *Tr. cariniferus* depicted on the next plate of the Catalogue of Shield Reptiles (xxxii) has convinced me that it is the same species as I subsequently named *Tr. Phayrei*, to which conclusion I am led by the feeble development of the sternal bones and callosities, and the only point which seems to throw doubt on this result is, that the peculiar head-markings are not shown in Gray's figure. No markings whatever are shown on the head, and as this is so rarely the case with a young *Trionyx*, I conclude that the markings either had altogether faded from the specimen, or that the artist had from their indistinctness omitted to copy them.

Dr. Gray, in his note to this species, Catalogue of Shield Reptiles, p. 67, makes precisely the same comparison with regard to this species that both myself and Dr. Anderson did in describing our specimens. Dr. Gray's words are:—"The specimens of this species are larger than the stuffed example of *Tr. javanicus*, but yet they have no appearance of any sternal callosities. Bearing in mind that *Tr. javanicus*, Gray, of the above sentence is synonymous with *Tr. gangeticus*, Cuv., the above sentence curiously resembles the description of what I considered the most salient feature of distinction in the sternum of *Tr. Phayrei*, vide Journal of the Linnean Society, Vol. X, where I use these words—"the osseous tubercular surface, however, is less developed and more feebly sculptured (the age and size of the specimen considered) than in any of its allies, and at a glance serves to discriminate the present species from them." I need not here attempt any answer to the arguments and mistakes of Dr. Gray regarding this species in his paper in the Annals and Magazine of Natural History, for 1871, p. 83, as they have been already fully replied to by Dr. Anderson in the Annals for the same year, p. 324.

I append below a few comparative measurements in Mills of the skulls of the species treated of above:—

No. 1.	<i>Trionyx gangeticus</i> , Cuv.	...	(Imperial Museum).
" 2.	<i>Tr. Buchananii</i> , Th.	...	(Imperial Museum).
* " 3.	<i>Tr. stellatus</i> , Geoff.	...	From Moulmein, (Plate III).
" 4.	<i>Tr. cariniferus</i> , Gray.	...	" Moulmein, (Plate IV).

	I.	II.	III.	IV.
Length of skull	97·	105·	102·	100·
Width behind zygoma	51·	49·	44	54
Longest diameter of orbit	15	14·	12·5	14.
Between orbits	7	11·5	7·2	11·5
Extremity of skull to anterior rim of orbit	73·	98	77·	89
Anterior rim of orbit to tip of nasal bones	14	14	13·	12
Extreme length of mandible	58·	66·2	51·5	64
Extreme height	21·	24·5	19·	25
Median depth below in front	13·	19·	13	18

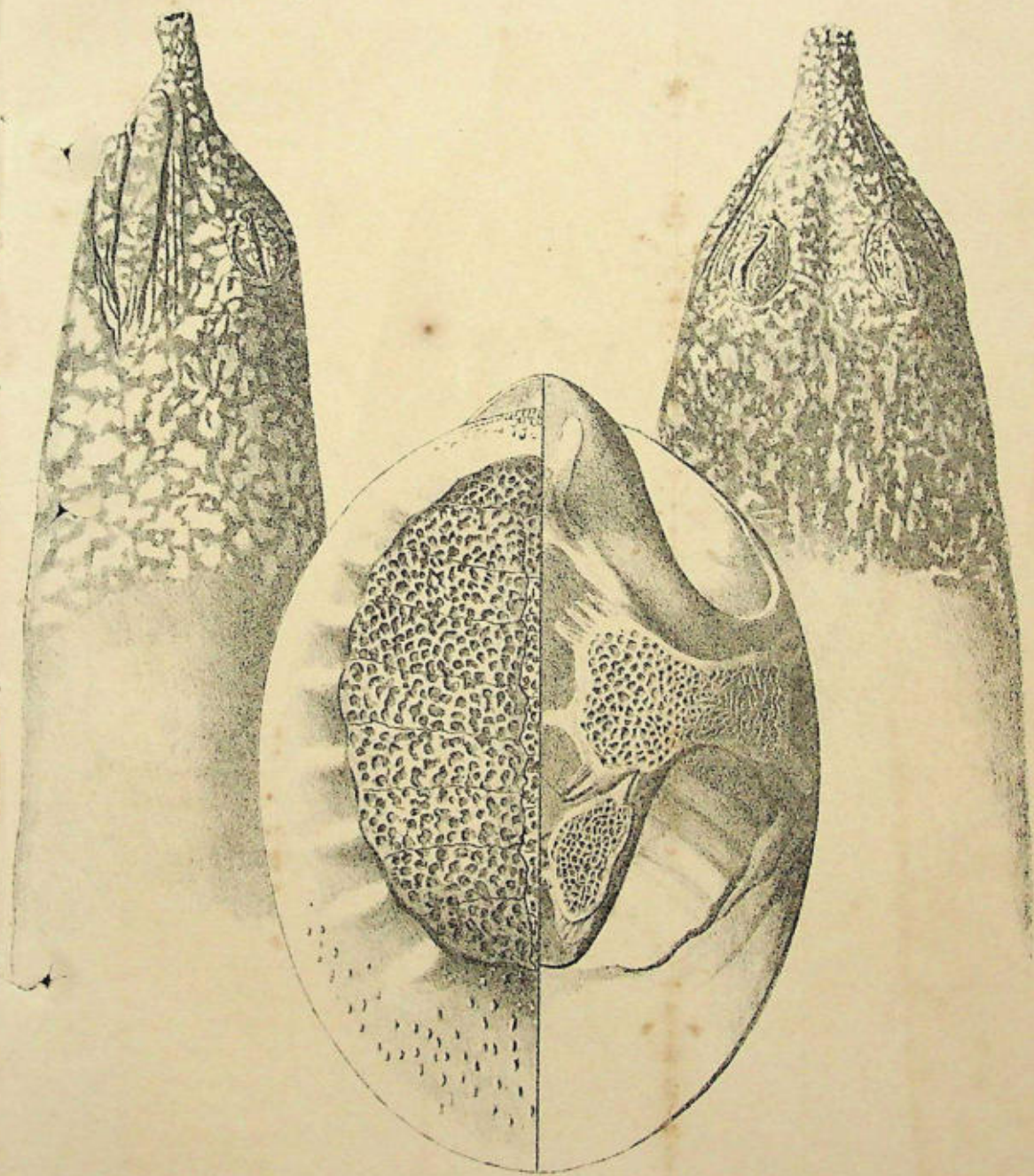
I shall now notice certain statements of Dr. Gray contained in his Supplement and Appendix to the Catalogue of Shield Reptiles, but it is quite beyond my powers, within the reasonable limits of a paper like the present, to follow Dr. Gray through all the changes of species and genera, which he has from time to time introduced.

At p. 10 of the Appendix to the Catalogue of Shield Reptiles, 1872, Dr Gray observes under the head *Notochelys platynota*:—"Mr. Theobald in his catalogue confounds this species with *Geomyda grandis*." Now in my catalogue of the Reptiles of Pegu, published in the 10th volume of the Journal of the Linnean Society, *Notochelys* is not mentioned, so the catalogue to which Dr. Gray refers must be that of the reptiles in the Museum of the Asiatic Society of Bengal, published in Calcutta by the Society in 1868, during my absence in England, and in which the only passage referring to *Notochelys* stands thus, p. 10, *Geomyda grandis*, Gray.

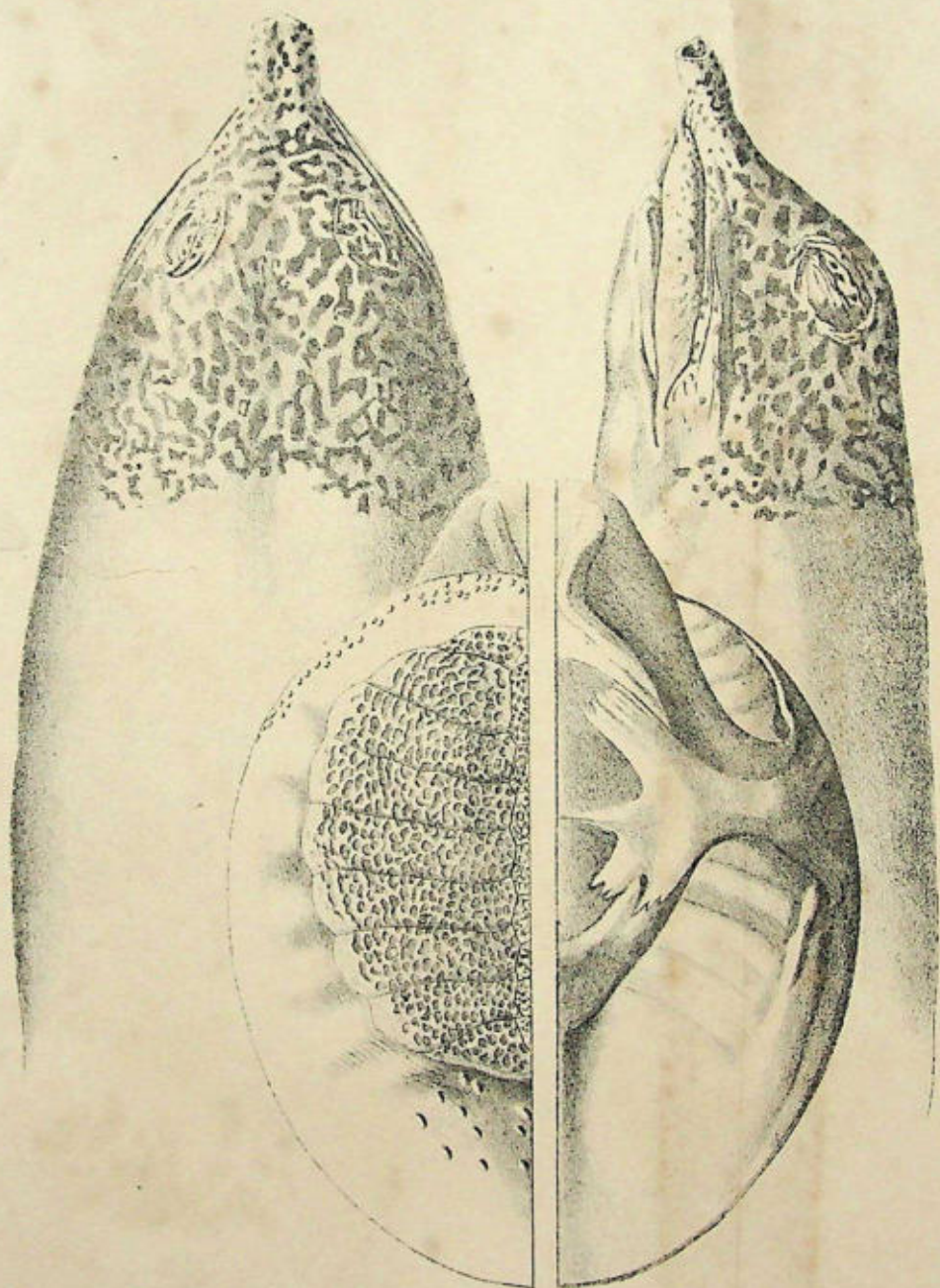
Cyclemys Platynota, Gray, apud Blyth.

Now I do not see how any naturalist can misunderstand the above passage, or affect to suppose that, in quoting a synonym as understood by another, the man who makes such quotation can be held thereby to endorse it. Had I intended it to be understood that I considered *grandis* and *platynota* synonymous, I should certainly have ranged *grandis* as a synonym of *platynota*, since the latter name dates from 1834, and the former only from 1860 (*vide* Annals and Magazine of Natural History, 1860, and Proceedings of Zoological Society, 1834,) but I did just the reverse, and I do not

* Both figures are one-third of natural size.



Trionyx stellatus Geoff



Trionyx cariniferus Gray (?).
T. thuyrei Theob.

understand what shadow of right Dr. Gray had to make so disparaging a statement. The specimen of *Geomyda grandis*, Gray, in question, was presented by myself to the Museum in 1855, and consisted of a carapace only, hence it was doubtfully referred at the time by Blyth to *Emys platynota*, Gray (*vide* Journal of Asiatic Society, Vol. XXIV, pp. 712 and 714), and I entered this identification of Blyth's as a synonym of the above specimen, being careful to add "*apud* Blyth," in order to guard against the possible error of future compilers recording, on the above erroneous identification of Blyth, the occurrence of *Notochelys platynota*, Gray, in Tenasserim, whence it had never to my knowledge been obtained.

Under the head "*KACHUGA*," Appendix, Catalogue of Shield Reptiles, p. 17, Dr. Gray endeavours to throw the blame of the complete muddle of *habitats* of the specimens in my collection on myself, with what justice and truth I shall now endeavour to show. To take *Kachuga peguensis* first; this species is based on a head stated to have been presented by "W. Theobald Esq., India;" *vide* Proceedings of Zoological Society, 1869, p. 200, Fig. 12. Now if there is any point I have laboured to convey, it is that India is not Pegu, or Pegu India, and, consequently, if I gave the *habitat* "India," it assuredly never came from Pegu. Referring, however, to the same skull in Appendix to the Catalogue of Shield Reptiles, p. 18, Dr. Gray says:—"The skull figured as *Kachuga peguensis*, Fig. 20, was purchased of a dealer to whom Mr. Theobald had sold it among some reptiles said to have come from Pegu."

Now it is clear that both these conflicting statements as to how the type of *K. peguensis* came into Dr. Gray's hands cannot be true, and equally clear is it also, that I can in no ways be held responsible for such contradictory statements; but towards clearing up the imbroglio, I will contribute a fact or two that may be useful.

If Dr. Gray is correct in considering his species, *K. peguensis* as a synonym of *K. trilineata* (*vide* Supplement, Catalogue of Shield Reptiles, p. 54), then the specimen undoubtedly never was received from me, and equally undoubtedly never came from Pegu; since *B. lineata*, Gray (Catalogue of Shield Reptiles, p. 35) does not occur in Pegu, where it is replaced by the larger species *B. trivittata*, Dum. et Bib., but as Dr. Gray seems sure the type was received from me, it must have been a Pegu specimen of *B. trivittata*, Dum. et Bib., as I had in my collection several shells and skulls of that species, but only one or two shells, but no skulls of the other. Why, moreover, *B. lineata*, Gray, of p. 35, reappears as *K. trilineata*, at p. 54, I don't know; still less can I imagine, why the entirely distinct *B. trivittata*, Dum. et Bib., should figure as a synonym of it, with my name attached to it in the Supplement, at pp. 54, 55. I specially protested in person to Dr. Gray against the idea of the Pegu form being an Indian species

leaving the correctness of my identification of it with the *B. trivittata*, Dum. et Bib., an open question, and yet Dr. Gray transfers my description of the animal of the Pegu *trivittata* to the Indian *lineata*, a perfectly distinct animal.

HARDELLA THURGI. Under this head in his Appendix to the Catalogue of Shield Reptiles, p. 18, Dr. Gray indulges in a singularly disingenuous piece of criticism, breaking off his quotation of what I wrote, just where my words show that I had anticipated him in removing "*Thurgi*" from *Emys* to *Batagur*! Dr. Gray writes (*loc. cit.*):—"Mr. Theobald observes that *this species is very common at Calcutta, though adults are not very easily obtained* (the italics are my own). It appears to be more allied to *Batagur* than *Emys*, yet he did not discover that the skull that I had figured as *Kachuga Oldhami* was the skull of this species," &c. I would remark that Dr. Gray established his spurious species *K. Oldhami* in March, 1869, whilst the passage Dr. Gray quotes above was published in my Catalogue of Reptiles of the Asiatic Society, Bengal, in 1868! The exact words I really wrote are as follows, which I give for comparison with the above:—

"*A very common species at Calcutta, though adults are not very easily got. It appears to me more nearly affined to Batagur than to Emys.*" This was the sum total of my remarks, and it was not till two years later that Dr. Gray pronounces his adhesion to the above view in his Supplement to the Catalogue of Shield Reptiles, p. 58, in the following words under the head of *Hardella Thurgi*:—

"By examining the head of the adult specimen in the British Museum, I have been enabled to prove, what I have long suspected, that *Thurgi* is a *Bataguroid*; and also to identify the skull which I figured as *Kachuga Oldhami* as the skull of this species!" Dr. Gray may truly be congratulated on the complacency with which he refers to his labours on the craniology of the *Testudinata* when within the compass of a few pages he describes as new species, three old and two of them well-known forms, *e. g.*, *Scaphia Falconeri*, Gray = *Testudo Phayrei*, Blyth; *Kachuga Oldhami*, Gray = *Batagur Thurgi*, Gray; and *Kachuga peguensis* = *Batagur lineata*, Gray, as admitted by himself in Supplement to the Catalogue of Shield Reptiles, p. 56, and to crown all his founding his genus *Potamochelys* on a skull of the common *Emys*! *vide* Ann. of 1872, p. 340.

My reason for so summarily disposing of Dr. Gray's new species *Kachuga Oldhami* was this: I had examined Dr. Oldham's specimens before they passed into Dr. Gray's hands, and if the new species was *really*, as stated, founded on one of Dr. Oldham's specimens, I knew it must be founded on one of our common *Batagurs*, which one, however, I had neither means or leisure to determine,

and rested content therefore with recording my belief to that effect in a paper communicated to the Zoological Society, an abstract of which however was all that was allowed to appear in its Proceedings.

Finally, I will hazard placing on record my distrust of the correctness of Dr. Gray's identification of the skull of *Emys* (*Melanochelys*) *trijuga*, Supplement, Catalogue of Shield Reptiles, p. 34, on the ground that to the best of my recollection no such species was contained in Dr. Oldham's collection. At all events, no harm can be done by my so doing.

CALCUTTA, July 21st, 1873.

P. S.—Since penning the above paper, the Proceedings of the Zoological Society of London, Part I, for 1873, have come into my hands, wherein a paper by Dr. J. E. Gray on the *Trionychidæ* calls for some remarks from me, which I prefer embodying in the form of a postscript, rather than intercalating in the preceding pages.

The first point I have to notice is Plate VIII, whereon two specimens of *Tr. gangeticus*, each of which display four well marked ocelli, are figured. From this it is clear that Dr. Gray is no less incredulous than myself of the correctness of Dr. Anderson's observation that this species never presents ocelli, as I have shown above. This is a point however whereon further information is desirable, and I shall look with some interest to what Dr. Anderson may subsequently have to urge in corroboration of his view. The next species I would notice is *Nilssonina formosa*, p. 45, under which head Dr. Gray expresses himself as follows:—"It appears that this and the other *Trionyx*, marked "Pegu," do not really come from that place; for although the collection was sold as from "Pegu," it contained many specimens from other parts of Hindustan."

The above sentence, as it stands, is extremely unintelligible. In the first place, *by whom* were the specimens marked as coming from Pegu, which in reality came from somewhere else, and what is meant by *marking*? I do not remember that I ever marked any *Trionyx*, and I certainly challenge Dr. Gray to substantiate his assertion by producing some of the many specimens sold by me as coming from Pegu, but in reality coming from Hindustan. As a matter of fact, I can assure Dr. Gray that, if *Nilssonina* was described from a specimen in spirit in my collection, it assuredly came from Pegu, and Dr. Gray has been much misinformed by any one who has asserted the contrary. But why does not Dr. Gray give his authority for *now* stating that *Nilssonina* does not come from Pegu. Had he done so, the rectification of such incessant and petty errors would not be the never-ending task it is. Then again what is "the other *Trionyx* marked Pegu," and to whom is Dr. Gray indebted for the information that the two adult skulls of *Trionyx* procured by me in Pegu, both of which moreover perished by my revolver bullet, did not come from that province? Till Dr. Gray condescends to state the authority on which he

makes the above *quasi* corrections of the *habitat* furnished by the original possessor of the specimen, little real progress can be made in obviating such mistakes in future; as far however as can be judged at present, Dr. Gray seems to be himself mainly to blame.

Tr. hurum, Buch. Ham.

Tr. sewaare, Buch. Ham.

Tr. ocellatus, Gray.

At pages 49, 50, 51, Dr. Gray separates all these forms as distinct species, but without characterising them.

As regards *Tr. hurum*, I have nothing to add to what I have remarked previously in my paper. Of *Tr. sewaare*, Dr. Gray figures "*the skull of a young species*," which fairly corresponds with a skull extracted by myself from a fresh example of a *Trionyx ocellatus*, Gray. As far therefore as present materials allow us to decide, all these three names must rank as mere synonyms of *gangeticus*, though they have all probably been unwittingly applied to another species, which in the above paper I have separated under the name of *Tr. Buchanani*.

Isola peguensis.—At p. 51, Dr. Gray establishes a new genus, *Isola*, for the reception of the skull of a *Trionyx*, procured in Pegu, by myself, displaying the effects of my revolver bullet on it, but which, as I have shown above, Dr. Gray now considers to have come from Hindustan (*vide* p. 45). This species, if not identical with, is very closely allied to, *Tr. stellatus*, Geoff., but the coloration of the head of this species (if my identification of it, *vide* Plate III, is correct) would seem to differ from Dr. Gray's description of an example in spirit.

2. *On the discovery of a super-orbital chain of bones in the Arboricola (Wood Partridges).*—By J. WOOD-MASON.

This note will be printed in Journal, Part II, 1874.

3. *Description of new Marine Mollusca from the Indian Ocean.* By MESSRS. G. and H. NEVILL.

This paper will appear in Journal, Part II, No. 1, 1874.

The President then addressed the meeting as follows:

Gentlemen, before we separate this evening, I should wish to say a few words in tribute to the memory of one who laboured long and well in the interest of this Society, and of whose death we have so lately heard.

I speak of Mr. Blyth, of whose loss we must all of us have heard with unmixed regret. On looking round, I do not find one present who had sat with him at this table or who had worked with him here in India, and who could speak personally of his labours, not that such is necessary, for our Journal teems with his work, and his name is familiar to every naturalist in India, and to every working member of this Society.

I feel that not being a naturalist, I am unable to do adequate justice to his work. Mr. Blyth came out to India in 1811. He was the first Curator of the Museum of this Society, and in that year took over the office which had previously been honorary.

This office he retained till 1863 when he retired on a small pension granted by the Government of India for his excellent service.

His works were—before he came to India, an English translation of Cuvier's "Regne Animal," in which the Mammals, Birds, and Reptiles were edited by him; many of his own notes suggesting modifications in the then existing systems of classification, have been subsequently fully substantiated and adopted.

After his arrival in India, most of his works appeared in the Society's Journal, where these papers are so numerous, and their value so well known, that there can be no necessity for me to do more than refer to them.

Mr. Blyth was an enthusiastic zoologist, he lived for his science and probably had the greatest knowledge of Indian Birds and Mammals of any naturalist of his time.

LIBRARY.

The following additions have been made to the Library since the meeting held in February last.

Presentations.

*** Names of Donors in Capitals.

Philosophical Transactions of the Royal Society of London, Vol. 162, Part II.

General Sir Ed. Sabine—Contributions to Terrestrial Magnetism, No. XII. *Sir B. C. Brodie*—An Experimental enquiry on the Action of Electricity on Gases,—I, on the Action of Electricity on Oxygen.

THE ROYAL SOCIETY OF LONDON.

The Transactions of the Linnean Society of London, Parts II and III. 1873.

Part II, *Professor Oliver and Col. Grant*—The Botany of the Speke and Grant Expedition, an Enumeration of the Plants collected during the journey of the late Capt. J. H. Speke and Capt. (now Lieut.-Col.) J. A. Grant from Zanzibar to Egypt.

The Journal of the Linnean Society, (Zoology), Vol. XI, Nos. 55 and 56.
No. 55. *A. Muller*—Note on a Chinese Artichoke-gall (mentioned and figured in Dr. Rance's paper "on Silkworm oaks") allied to the European Artichoke-gall of *Aphilothrix gemma*, Linn.

No. 56. *Ed. Saunders*—Description of *Buprestidae* collected in Japan, by G. Lewis, Esq., *Surgeon-Major F. Day*—On some new Fishes of India.

(Botany), Vol. XIII, Nos. 68-72.

No. 69. *W. Mitten*—New species of *Musci* collected in Ceylon, by Dr. Thwaites. *W. A. Leighton*—On two new species of the Genus *Mycoporum*, Flotow (Bamboo-lichens from Pegu). *W. T. T. Dyer*—On the determination of three imperfectly known species of

Indian *Ternstroemiaceæ*. F. Curry—On a new Genus in the order *Mucedinæ*. (describes a fungus found on the flowers of *Hibiscus rosae sinensis* in Calcutta).

No. 72. Note on *Cunninghamia infundibulifera*.

THE LINNEAN SOCIETY OF LONDON.

Journal of the Chemical Society, August and September, 1873.

Dr. H. Sprengel—On a new class of Explosives, which are Non-explosive during their Manufacture, Storage and Transport.

THE CHEMICAL SOCIETY OF LONDON.

The Journal of the Anthropological Institute, 1873, July and October.

Lieut. S. C. Holland—Exhibition of Aino Photographs. W. L. Distant.—Eastern Coolie Labour.

THE ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

The Transactions of the Royal Irish Academy, Vol. XXIV. (Science), Parts 16 and 17 and Vol. XXV, Parts 1-3.

Part XVI, R. S. Ball—On small oscillations of a Rigid Body about a Fixed Point under the Action of any Forces and more particularly when Gravity is the only Force acting.

Proceedings of the Royal Irish Academy, Vol. X, Part IV. Vol. I. New series, Nos. 2-6.

THE ROYAL IRISH ACADEMY OF DUBLIN.

Bulletin de la Société de Géographie, Décembre, 1873.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Bulletins de la Société D'Anthropologie de Paris, Vol. VII. Fasc. 5 Vol. VIII. Fasc. 1 and 2.

Vol. VII. Fasc. 5. Hamy—Sur les travaux de M. Jannéan relatifs à l'anthropologie du Cambodge. Hamy—Les négritos à Formose et dans l'archipel Japonais.

Vol. VIII. Fasc. 1. De Quatrefages. Sur les populations du bassin de l'Amour.

Fasc. 2. Martin—Chinois et Miaotze.

THE ANTHROPOLOGICAL SOCIETY OF PARIS.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, 1873, November.

Buschmann—Über die Krama-Veränderung in der Javanischen Sprache.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Jahrbuch der K. K. Geologischen Reichsanstalt. Band XXIII, Nos. 1-2.

Ueber einen neuen Fossilen Saurier aus Lesina, von Dr. A. Kornhuber.

Die Cephalopoden fauna der Gosauschichten in den Nordöstlichen Alpen, von A. Redtenbacher.

THE IMPERIAL GEOLOGICAL INSTITUTE OF VIENNA.

Atti della Reale Accademia delle Scienze di Torino, Vol. VIII, Disp. 1a,—6a.

Disp. 1a. Salvadori.—Relazione intorno ad una memoria del signor Tapparone-Canefri riguardante *Una nuova specie del genere Nephrops*.

THE ROYAL ACADEMY OF SCIENCES OF TURIN.

Mémoires de la Société Royale des Antiquaires du Nord, 1872.

Aarboger for Nordisk Oldkyndighed og historie 1873, Hefte 1-4.

THE ROYAL SOCIETY OF NORTHERN ANTIQUARIES, COPENHAGEN.

Bulletin de l'Académie Impériale des Sciences de St. Petersburg.

Tome XVII, Nos. 4 and 5, and Tome XVIII, Nos. 1-2.

Tome XVII. No. 4. *C. J. Maximowicz*—Diagnoses des nouvelles plantes du Japon et de la Mandjourie, Onzième décade. *H. Wild*—Un nouvel instrument pour l'observation de l'intensité verticale du Magnétisme terrestre. *B. Dorn*—Extraits des auteurs orientaux, relatifs à la mer Caspienne et aux pays adjacents. *B. Dorn*—Deux pierres avec inscriptions orientales, reçues récemment au Musée Asiatique.

Tome XVIII, No. 1. *Alex. V. Bunge*—Hypogomphia, une nouvelle espèce de labiacées, provenant de Tashkent. *C. J. Maximowicz*—Diagnoses des nouvelles plantes du Japon et de la Mandjourie, Douzième décade.

No. 2. *El. Metchnikof*—Quelques remarques concernant l'embryologie des Myriapodes. *El. Metchnikof*—Quelques observations concernant l'embryologie des Polydesmides.

Mémoires de L'Académie Impériale des Sciences de St. Petersburg.

Tome XVIII, Nos. 8-10 et Tome XIX, Nos. 1-7.

Tome XVIII, No. 8. *H. Wild*—Études Meteorologiques.

Tome XVIII, No. 10. *Dr. F. von Asten*—Berechnung eines Wichtigen theiles der absoluten Jupiterstörngen des Enckéschen Cometen.

Tome XIX, No. 1. *Dr. E. Russow*—Vergleichende enter suchungen betreffend die histiologie (histiographie und histiogenie) der vegetativen und sporenbildenden organe und die entwicklung der sporen der Leitbündel kryptogamen, mit berücksichtigung der histiologie der Phanerogamen ausgehend von der betrachtung der Marsiliaceen.

No. 2. *Dr. Magnus Nyrén*—Bestimmung der Nutation der Erdachse.

No. 3. *M. F. Schmidt*—Über die Petrefakten der Kreideformation von der Insel Sachalin.

No. 4. *J. Doell*—Die Sammlung Cesnola.

No. 5.—*M. Brosset*—Des Historiens Arméniens des XVII^e, et XVIII^e Siècles, Arakel de Tauriz.

No. 6. *A. Schiefner*—Awarische Texte.

No. 7. *Dr. L. Stieda*—Studien über den Amphioxus lanceolatus.

THE IMPERIAL ACADEMY OF SCIENCES OF ST. PETERSBURGH.

Bulletin de la Société Impériale des Naturalistes de Moscou.

Tome XLVI, No. 1.

Professor Th. Bredichin—Observations spectroscopiques du Soleil faites pendant l'été de 1872. *Berg*—Die resultate der Acclimatisation von Antherea Yama-mayu G. M. in den Ostsee provinzen. *P. Stepanoff*—Ueber die Entwicklung von Calyptraea.

THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

Journal of the Academy of Natural Sciences of Philadelphia, Vol. VI, Part I.

J. Lea—New *Unionidae*, *Melanidae*, etc., chiefly of the United States. *E. D. Cope*—On the structures and distribution of the Genera of the Arciferous Anura.

Proceedings of the Academy of Natural Sciences of Philadelphia. 1848—1857, 6 vols. and 1862, Nos. 1-6.

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

The Rāmāyana, Vol. II, Part IV, by Hemachandra Bhattacharya,

THE EDITOR.

The Christian Spectator, February and March, 1874.

THE EDITOR.

Notes on the Synonymy of some Indian and Persian Birds, with descriptions of two new species from Persia, by W. T. Blanford.

THE AUTHOR.

Journal des Museum Godeffroy, Heft. III. Andrew Garrett's Fische der Südsee, Heft. I., by A. C. L. Günther.

W. T. BLANFORD, ESQ.

De l'Emigration des Chinois du point de vue des intérêts Européens par Ed. Madier de Montjan.

THE AUTHOR.

A Grammar of the Chinese Language, by Professor Leon de Rosny.

THE AUTHOR.

The Zoology of the Voyage of H. M. S. Erebus and Terror, by Sir J. Richardson and J. E. Gray.

DR. J. E. GRAY.

Vocabulary of Dialects spoken in the Nicobar and Andaman Islands, by Fr. Ad. de Röepstorff.

THE AUTHOR.

Mahabharata, Salya, Souptika and Striparvas in Bengali and Sanscrit.

HIS HIGHNESS THE MAHARAJA OF BURDWAN.

The Indian Antiquary, January, February, 1874.

The Flora Sylvatica for Southern India, Part XXVIII, by Major R. R. Beddome.

Icones Plantarum Indiæ Orientalis, Parts X, XI, by Major R. R. Beddome.

Tarikh Irân or History of Persia, Parts I, II, by Sir J. Malcolm

THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

Diary of a Journey through the districts of Minow, Shamil, and Kow Gunow, during the month of August.

THE GOVERNMENT OF INDIA, FOREIGN DEPARTMENT.

Archæological Survey of India. Report for the year 1871-72, Vol. III, by A. Cunningham, C. S. I.

THE GOVERNMENT OF BENGAL.

Report on the Administration of the Punjab and its dependencies for the year 1872-73.

THE PUNJAB GOVERNMENT.

Report on the Trade and Resources of the Central Provinces for the year 1872-73.

THE CHIEF COMMISSIONER, CENTRAL PROVINCES.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR APRIL, 1874.

The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 1st of April, 1874, at 9 o'clock P. M.

Col. H. Hyde, R. E., President, in the chair.

The following presentations were laid on the table:—

1. From the Superintendents of Revenue Surveys, a copy of General Report of the Revenue Survey operations of the Upper and Lower Circles for season 1872-73.

2. From Hyde Clarke, Esq., a copy of Memoir on the Comparative Grammar of Egyptian, Coptic, and Ude.

3. From the Government of India, D. P. W., copies of correspondence relating to the boring of an Artesian Well at Umballa.

4. From D. Ibbetson, Esq., a copy of Engelmann's *Bibliotheca Historico-Naturalis*, vol. I., and a copy of Carus and Engelmann's *Bibliotheca Zoologica*, vols. 1 and 2.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected ordinary members—

W. D. Bruce, Esq., C. E.

J. Kimber, Esq., C. E.

The Rev. Fr. E. Lafont, proposed at the last meeting by the Council was balloted for and elected an Associate Member of the Society.

The following are candidates for ballot at the next meeting—

Col. D. G. Robinson, R. E., Director General of Telegraphs in India, proposed by Col. Hyde, R. E., seconded by L. Schwendler, Esq.

F. J. V. Minchin, Esq., of Aska, Ganjam District, proposed by L. Schwendler, Esq., seconded by Captain Waterhouse.

A. Bond, Esq., Bengal Marine Service, proposed by H. H. Locke, Esq., seconded by the Hon. J. B. Phear.

The following have intimated their desire to withdraw from the Society—
Captain E. H. Steel.

A. Rogers, Esq.

The President reported that the Council recommend the following alterations in the Bye-Laws, and stated that according to clause C. of Rule 32, voting papers would be sent round to non-resident members of the Society, and that the alterations would be discussed at the Ordinary General Meeting to be held on the 1st August next.

I. That in Rule 14, instead of the words "*his subscription should be Rs. 12 per annum, commutable into a single payment of Rs. 100,*" the following should be substituted, "*his subscription shall be Rs. 16 per annum, commutable into a single payment of Rs. 150,*" and that the following addition should be made to the rule as it stands at present, "*and provided that members who are at present paying at the rate of Rs. 12 per annum, or who shall have paid Rs. 100 as compensation, shall not be called on to pay the higher rate.*"

II. That in Rule 34*d* after the word "*chair,*" the following words be added, "*or in their absence the senior member of Council;*" and after the words "*Vice-Presidents*" (2nd) the words "*nor a member of the Council.*"

III. That subject to the concurrence of Government the following Rule be added after Rule 36.

36A. *With reference to the provisions of Act XVII, of 1866, (the Indian Museum Act) Section 3, the Trustees of the Indian Museum, on the part of the Society, shall be nominated from among the members of the Council with the proviso that on vacation of their seats in the Council their trusteeships shall also terminate.*

The President also reported that the Council have nominated Mr. J. Geoghegan, a Trustee of the Indian Museum on the part of the Society in place of Mr. H. F. Blanford, resigned.

Mr. Blochmann exhibited a gold coin forwarded by J. G. Delmerick, Esq., for the purpose of being laid before the meeting. Mr. Blochmann said that it was a rare coin, struck by Mahmūd ibn Muhammad Shāh ibn Tughluq Shāh, a puppet king whose reign was so short and precarious, that the historians scarcely allude to him. Another specimen of the same coin was in the possession of General Cunningham, who more than a year ago mentioned the legend of the coin in one of his letters to the Society.

As the coin was rare, a woodcut had been prepared for publication together with Mr. Delmerick's note in the Journal. Mr. Delmerick thought the date to be 752 A. H.; but he (Mr. Blochmann) took it to be 754 A. H., and believed that the puppet king was set up at Dihli during Firūz Shāh's invasion of Bengal. This would satisfactorily explain the unexpected retreat of the Imperialists from Panquah.

Dr. G. Bühler, of Bombay, gave an account of his tour through Western Rājputānā in search of Sanskrit MSS. He stated that the first

large libraries, which he found, were at Jodhpúr. The Mahárájá of that place possessed a collection of about 1,800 Sanskrit MSS. purchased originally by Mahárájá Mínsingh, the great devotee and student of Yoga and Vedánta, of whom Col. Todd had given an account in his 'Annals of Rájasthán.' The MSS. of Puráṇas, Vedánta and Yoga works were most numerous; and the first included many very rare works. Unfortunately, many of the MSS. were very incorrect and unfit to be copied, though they might be useful for collation. Two MSS., a text of and a commentary on, the Kaushitaki Bráhmaṇa as well as a rare commentary on the Charanarvúha, had been selected for copy. A number of old Jaina MSS. had likewise been bought in the bazar, among which there were a Desinámamálá and a complete copy of the Sanskrit grammar of Hemachandra.

The town next visited by Dr. Bühler was Jesalmír, and there the Bhandár of the Oswál Jains gave unexpected results. Besides complete sets of the Jaina scriptures with commentaries, very old copies of five dramas, several epic poems and works on Sāṅkhya, Nyāya and Alankára were found. The oldest of these MSS. dated from Samvat 1160, or 1103-4 A. D.

There appeared to be no doubt that a collation of these MSS. with the known texts would give most important results. Further, about a dozen unknown poems and scientific works came to light, among which there were two historical books. One of these, the Vikramárka-charita of Bilhana, had been already copied, and Dr. Bühler proceeded to give an abstract of a portion of the work. It appeared that it contained the history of the great Chálukya prince, Vikramádityadeva of Kalyánakataka, or Kalbargá, written by his Vidyapati or chief Paṇḍit, as well as notices of his predecessors and of contemporaneous princes, such as Bhoja of Dhârâ and Harshadeva of Kashmír.

Besides the Bhandár, Dr. Bühler saw at Jesalmír four other large Jaina libraries and purchased from paṇḍits and others twenty-three valuable MSS., amongst which there was an unknown Karana by Bhojá of Dhârâ.

Bikáner also, whither Dr. Bühler proceeded from Jesalmír, furnished many valuable books. From the Rájá's library copies of very rare Vedic works, among them the Prâtisákhyas of the Atharvaveda and the Nāṭya-sāstra of Bharata were obtained. Besides, 120 MSS. were purchased for Government, referring chiefly to the Jaina religion. But also some exceedingly rare Brahmanical books, such as Yuzapurána of the Gargi saṁshítá and a large portion of the Nyāsa, a Bauddha commentary of the Kásiká vṛitti, were secured.

Bhatnúr, the last town visited, did not furnish as good results as had been expected. But a library containing about 800 MSS. was examined, and some works referring to the history of the Jains and of Gujarát were secured.

The President said, that the Society were very much indebted to Dr. Bühler for the very interesting account he had given of his tour, and proposed that a vote of thanks should be given to the learned professor.

The proposal was put to the vote and carried unanimously.

Mr. Bayley was sure the meeting had heard with interest the lucid account given by Doctor Bühler of his journey and his discoveries. It was unfortunate that several of the members of the Society who would have most enjoyed his relation, were absent, Bábu Rájendralála Mitra for example. Mr. Bayley wished that the Hon Mr. Justice Phear had heard his account of the work which was the ancient authority for the doctrine of the Mitákshara, the discovery of which could not but arrest the attention of all Indian lawyers.

For himself Mr. Bayley confessed that his own predilections inclined to History, and Dr. Bühler's new acquisitions in this subject would, he felt sure, prove invaluable. From a recollection of a conversation with General Cunningham as to the MSS. at Bhatnir, Mr. Bayley thought that Dr. Bühler's conjectures as to the fate which had befallen them were not improbable. He certainly remembered General Cunningham telling him that one of the MSS. at Bhatnir mentioned "Kanishka," and it was not impossible that this was the identical MS. which Dr. Bühler had secured. The only matter of regret was that Dr. Bühler's labour in so promising a field had been hindered by any want of time or money, and it was to be hoped that they would at some future time be resumed under more favourable auspices. Still, as it was, Mr. Bayley was sure that they commanded the interest and respect of those who had heard him to-night, and that Dr. Bühler deserved not only the thanks of this Meeting and of this Society, but of the Government and of the people of India.

The following papers were read:—

1. *Observations on Indian Fishes.* By SURGEON-MAJOR F. DAY.

This paper will be published in Journal Pt. II, No. 1, 1874.

2. *Notes on new Bengal Inscriptions, received from Mr. E. V. Westmacott, C. S.*—By H. BLOCHMANN, Esq., M. A.

These inscriptions will be published in Journal, Part I, No. II. Several of them are of great value, especially one Mahmúd Sháhi of 859; two Firúz Sháhís, one of them of 894; several Husain Sháhís of 899, 907, 918, &c., on which the king is called "the conqueror of Kámrú and Kámtah;" two Nugrat Sháhís of 930 and 938, &c., &c. All these inscriptions, Mr. Blochmann said, had been discovered by Mr. Westmacott in the immediate neighbourhood of Máldah; and he hoped that Mr. Westmacott would find leisure to examine the whole district, which no doubt contained the most valuable materials for the further elucidation of Bengal history.

In connexion with these inscriptions, he would read of Mr. Westmacott's letter on the position of Fort Ekdálah, for which historians had hitherto looked in vain. Mr. Westmacott says—

"From Poroowa (Hazrat Panduah) an old embanked road, called by the people "Nawábi Rastah," runs northward in the direction of Tájpore (not on the maps,) and another runs towards Debkot. Following this road, at a point some twenty miles from Poroowa and four miles east of Churámon, you will see a place marked 'Chilumpoor,' a corruption of Salimpúr. Leave the road at this point, and a mile to the eastward is a place called by the natives EKDA'LAH. It is highland, planted with mango trees, and shewing traces of embankments and brick buildings; and during the rains, when the surrounding country is extensively inundated, it stands up like an island. It agrees marvellously well with the description of the fort which baffled Firúz Sháh's army from the extent of the inundations surrounding it. It is a good day's march from Poroowa, on one of the military roads, and in the direction in which a Poroowa king would retire before an enemy that came down the Ganges valley to attack him. The people say that the remains are 'Nawábi.'"

3. *On the occurrence of TUPAIA ELLIOTTI, Waterhouse, in the Satpura Hills, Central Provinces.*—By V. BALL, Esq., M. A.

(Received March 8th, 1874.)

To-day I shot a specimen of the Madras Tree-shrew in the terai under the Motúr range of hills. It was a male, and measured 15", of which the tail to tip contributes 8."

It ran out of some long grass and was perched on a stone at the foot of a tree which it was about to ascend, when I shot it.

This is I believe an addition to the hitherto known fauna of the Central Provinces.

Dr. Jerdon says that this species was first procured by Mr. W. Elliot on the hills west of Madras—the continuation of the western Ghats; but that it does not appear to be common.

The discovery of this small animal in the Central Provinces is the more interesting when viewed in connection with the fact that there are to be found there also several species of birds, southern forms, whose occurrence so far north was not known to Dr. Jerdon. Particularly I would mention the Malabar whistling thrush (*Myiophonus Horsfieldi*, Vigors) which I have obtained both in these hills and also, two years ago, far to the east in the Highlands of Sirgúja.

I recognised this animal as a *Tupaia* at once, from having obtained another species last year in the extreme south of the Great Nicobar. Java, Sumatra and Borneo, have each, it is said, got its distinct species of this genus; but whether the Nicobar species is identical with either of these I cannot say, as Dr. Stoliczka took all the Nicobar specimens for

comparison, and his departure for Yarkand has, I believe, prevented him from fulfilling his intention.

Camp, Satpura Hills, 3rd March, 1874.

Note.—Since writing the above, I have had an opportunity of comparing my specimen with the types from Vizagapatam in the Museum, and assuring myself of the identity of the species. Curiously I find that Mr. Wood-Mason has recently received specimens of the same species from Mr. Lockwood of Monghyr who obtained them in the Karakpúr Hills, thus shewing this little animal to have a very extended range throughout Continental India. A specimen of *Tupaia* from Assam kindly lent to me for examination by Dr. Day, appears to be identical with the Burmese species *Peguana*, Less. It was obtained by Dr. Jerdon at Darjiling, so might naturally have been looked for in Assam.

Calcutta, 15th March, 1874.

4. *On an ancient Perforated Stone found in the Satpura Hills.*—

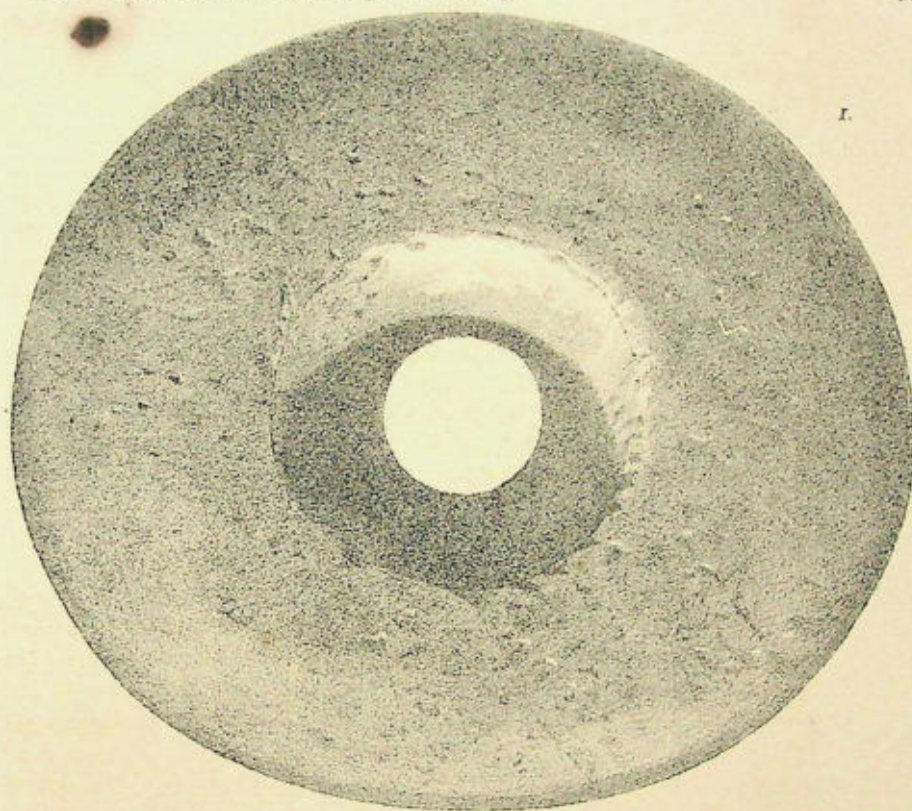
By V. BALL, ESQ., M. A.

I take this opportunity of exhibiting to the meeting a very curious perforated stone which was found last February on the surface at the Mopáni coal mines in the district of Narsingpur, Central Provinces. The accompanying sketch (Plate V.) will convey an idea of the appearance of this object better than any description could.

It is a water-worn pebble of basalt, weighing 1lb. 10 oz. The central perforation is bevelled away to both faces, a feature which has been observed in some of the perforated stones found with ancient stone implements in other parts of the world. Thus, in a work on Lacustrine dwellings of the lake of Neufchatel by M. E. Desor,* a figure is given of a stone which only differs from the one now exhibited in being very much smaller. M. Desor says, that with objects of the Bronze period, these discs occur too, but then they are made of baked clay. He supposes that they were used as weights for spindles. The specimen I exhibit is not only too heavy to have been used for that purpose; but the ease, with which the finger, when passed through the perforation, rests against the bevelled sides, and the firm grasp of the stone which becomes thereby possible, suggest that it was used as a hammer. It may even have been used as a kind of "knuckle-duster" in encounters with men or wild beasts; or for flinging like a quoit at small animals.

As it is important that all discoveries of ancient stone implements should be recorded, I add that last year, in the Ranigunj coal field, I found lying on a laterite-strewn surface, a well formed quartzite axe of the ordi-

* "Les Palafittes ou Constructions Lacustres du lac de Neufchatel, par E. Desor."



RING STONE

Found at Mopani C. P.

(I. Front view II. Section from a to b.)

Note on the raw materials for Iron smelting in the Raniganj Field. *H. B. Medlicott*.
 Note on the habitat in India of the Plastic sandstone or so-called Itacolomyte. *F. R. Mallet*.—Geological Notes on part of Northern Hazaribagh.

THE GOVERNMENT OF INDIA.

Verzeichniss der Bücher über Naturgeschichte, welche in Deutschland, Scandinavien, Holland, England, Frankreich, Italien, und Spanien, in den Jahren 1700-1846 erschienen sind, von Wilhelm Engelmann.

D. C. J. IBBETSON, Esq., C. S.

Verzeichniss der Schriften über Zoologie, welche in den periodischen Werken enthalten und vom Jahre 1846-1860 selbständig erschienen sind, von J. Victor Carns und Wilhelm Engelmann, Band 1-2.

D. C. J. IBBETSON, Esq., C. S.

Pratna-Kamra-Nandini, Vol. VI, No. XI.

THE EDITOR.

Kalki-Purāṇa, edited by Jaganmohana Tarkálankára, and published by Kedáranátha Banerji.

THE PUBLISHER.

Tagore Law Lectures 1873. The Muhammadan Law, being a digest of the law applicable especially to the Sunnis of India, by Shamacharn Sirkar.

THE REGISTRAR OF THE CALCUTTA UNIVERSITY.

Memoirs of the Geological Survey of India, Vol. X, Part 2. Theobald's Geology of Pegu.

THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

Selections from the Records of Government, North Western Provinces, Vol. VI, No. 4.

THE GOVERNMENT OF THE N. W. PROVINCES.

General Report on the Revenue Survey Operations of the Upper and Lower Circles for 1872-73, by Col. James E. Gastrell and Colonel D. C. Vanrenen.

THE SUPERINTENDENTS OF THE REVENUE SURVEY.

Report on the Charitable Dispensaries under the Government of Bengal, 1872.

THE GOVERNMENT OF BENGAL.

Icones Plantarum Indiæ Orientalis, by Lt.-Col. R. H. Beddome, Parts XII-XV.

THE GOVERNMENT OF INDIA.

Purchase.

The Life of John Thomas, by C. B. Lewis.

Exchange.

Nature, Nos. 222-226.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR MAY, 1874.

The monthly General Meeting of the Society was held on the 6th instant at 9 P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The receipt of the following presentations was announced—

1. From the Surveyor General of India, a copy of General Report on the Topographical Survey of India, and of the Surveyor General's Department for season 1872-73.

2. From Bábu Rájendralála Mitra, a Sanscrit MS. of Mrita Sanjivani by Kaláyudha (on Metres).

3. From Captain J. Waterhouse, Assistant Surveyor General, a copy of photozincographed Specimens of Indian Handwriting in various vernacular characters, collected by the Postmaster General, North Western Provinces.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

Col. D. G. Robinson, R. E.

F. J. V. Minchin, Esq.

A. Bond, Esq.

The following are candidates for ballot at the next meeting—

V. A. S. Smith, Esq., C. S., Azamgarh, proposed by Mr. F. S. Growse, seconded by Mr. H. Blochmann, M. A.

Sayyid Amir Ali, Esq., Barrister-at-law, proposed by Mr. H. Blochmann, seconded by Maulawi Kabiruddin Ahmad.

Mr. C. Sanderson and Lieut. C. T. Bingham have intimated their desire to withdraw from the Society.

Mr. Blochmann exhibited the following rubbings of inscriptions received from General Cunningham, C. S. I., and Messrs. E. T. Atkinson and H. James, C. S.

Bada'on.

The following inscription was published from an imperfect *reading*, forwarded to the Society by Mr. Wilson, Badáon, in the Proceedings for March, 1872, p. 49. General Cunningham's *rubbing* enables me to give now a correct reading and translation.

بنای این گنبد متین مخدومه جهان مرحومه مغفوره والد حضرت سلیمانی
علاء الدنیا و الدین عالمشاه سلطان در عهد سلطنت سلطان مذکور مؤرخا التاسع
عشر من رجب قدره سنه ست وستین و ثمانماية ۱۱

This strong vault of Makhdúmah Jahán, the late mother of his Majesty 'Aláuddunyá waddín 'A'lam Sháh the king, was erected during the reign of the said king. Dated, 19th Rajab (may its honor be increased!), 866 A. H. [19th April, 1462].

The inscription is of interest as it proves that 'A'lam Sháh was allowed, after his abdication in 855 A. H., to retain royal titles at Badáon, where he died in 883 A. H.

Dihlí.

The following rubbing is taken from a loose marble slab at 'Aláuddín's Treasury, Qutb Sháh, Dihlí. The slab seems to have belonged to the door of the mausoleum of some saintly person, who died in 932 A. H., during the reign of Ibráhím Lodí.

در زمان شه جهان اسلام • شد بلند این در سپهر جناب
گرچه صد باب هست جنت را • ایس باب بمثل هذا الباب
کرد شیخی بنا که در بابش • یوسف ثانی از حق است خطاب
چون ز تاریخ و نام کردم عرض • گفت درگاه خواجه اقطاب

1. In the time of the king of the Muhammadan world, this heavenly door was erected.
2. Although there are hundred gates in Paradise, there is no door like this door.
3. A Shaikh built it, whom you might correctly call a second Yúsof.
4. When I made a request regarding its date and name, he [the angel] said, 'The Dargáh of Khwájah i Aqtáb.'

This gives 932 A. H., or A. D. 1524-25.

A'grah.

The following inscription belongs to a ruined mosque in the old Burial Ground, at the Ajmir Gate, A'grah.*

* A rubbing of this inscription from Mr. A. Carlyle was exhibited in June, 1871. *Vide Proceedings*, for June 1871, p. 127; Keene's Agra Guide, p. 31.

The inscription contains the *Ayat ul-Kursi*, from the second chapter of the Qorán. Below it stands the following line—

بنا کرد در عصر نور الدین جهانگیر عادل پادشاه این مسجد و گنبد بندۀ احقر
حاجی سلیمان در سنه يك هزار و سی و يك ۱۰۳۱

This mosque and dome were built in the time of *Núruddín Jahángír*, the just, the king, by the mean slave *Hájí Sulaimán*, in the year 1031 [A. D. 1621-22].

Suja'n Deo, near *Alláhábád*.

• الله اكبر •

بفرمان شایسته خان سیدنا	چو تخت سلیمان بروی هوا
بجز قصد همراهی راهبر	ره از ارتفاعش نیابد نظر
بنای بلند عجب دلکشای	چو فکر بلند اندرین طرفد جای
بشد این بنا در سرای سپنج	بسال هزار و ده پنجاه و پنج
تمام این مکان وسیع لطیف	شد از اهتمام محمد شریف

God is great!

1. By order of *Sháistah Khán*, our lord, this building, which resembles the throne of Solomon in the air,
2. And the road to which without guidance, on account of its height, cannot be seen,
3. High, wonderful, pleasing, high like thought, and inside remarkable,
4. Was built in this world in the year 1055 [A. D. 1645].
5. This spacious and agreeable edifice was built under the superintendence of *Muhammad Sharíf*.

Bana'ras.

The following inscription belongs to the tomb of one *La'l Khán*, *Rájghát*, *Banáras*.

• یا فتاح العلیم •

دریغا لعل خان آن مرد یکتا	که بود اندر سخا چو ابر و دریا
سخاوت با شجاعت هردو میداشت	علم در نیک نامی نیک افراشت
مساکین پرور و درویش را دوست	مؤحد بسکه میگفتی همه اوست
ز دنیا رخت چون مردانه بر بست	بطل رحمت حق رفت و بنشست
بگفتم سال و صلش نور الله	تعالی مرقوده ای مرد آگاه

سنه هجری ۱۱۸۲

O God, the opener, the wise!

1. Alas, *La'l Khán*! that excellent man, who in liberality resembled the cloud and the ocean,
2. Who possessed both liberality and valour, and raised up high the standard of his fame,

3. A nourisher of the wretched, a friend of dervishes, a unitarian inasmuch as he said 'All is He.'*

4. When he bravely tied up his things to leave the world, and went to the shadow of mercy and dwelled there,

5. I said that the date of his departure lies in the words, 'May God Almighty illumine his grave, O wise friend!' A. H. 1182 [A. D. 1768].

Sakit, N. W. Provinces.

The following rubbings and readings of inscriptions were received from Mr. Harvey James, C. S., by Mr. E. T. Atkinson, C. S., Alláhábád, who kindly communicated them to the Society.

Mr. Blochmann said, Sakit is scarcely ever mentioned by Muhammadan Historians. The emperor Buhlúl Lodí got sick in Sakit and died there. In the *Áin*, Pargana Sakit is mentioned as belonging to Sirkár Qanauj. Its area was 132955 big'lahs, 9 biswahs, and the revenue is stated to have been 3,230,752 dáms.

A most remarkable event, however, in the local history is Akbar's fight with the Sakit dacoits, which according to the *Akbarnámah* took place in the beginning of the 7th year of his reign, (immediately after the conquest of Mair't'ha), *i. e.* in the latter half of 969 A. H., or beginning of 1562, A. D. The people inhabiting the villages round Sakit, it is said, stood unrivalled for their rebellious spirit and ungratefulness, especially those of eight places which were collectively called At'hgah.† "The eye of the age never saw rebels, thieves, and murderers like them; they are not only themselves disorderly, but keep the villages and their inhabitants in a disordered state, and they live a bold sort of life, which only fools call bravery." The officers of the district had frequently complained of the inhabitants, when it happened that his Majesty took his way to Sakit in order to hunt. Khwájah Ibráhim Badakhshí‡ was at that time Jágirdár of Sakit. The drivers fell in with a Bráhmaṇ of the name of Hápah, and took him to the emperor; for he wished to complain of the Sakit people, who had murdered his son and plundered his whole property. Akbar next morning resolved to punish the people of the place where the robbery had been committed, and sent a detachment of drivers in advance. When the emperor next morning arrived at the place, the drivers informed him that the people had all fled. Several detachments of soldiers were immediately sent out to hunt down the fugitives, and Qarátaq,§ the imperial Mir Shikár, killed a man and brought another to the emperor who had in the meantime come to the village of Paronk'h (MSS. *پرونكه* or *پرونكه*). Here, it was ascertained, the robbers had collect-

* The usual phrase denoting 'pantheism.'

† The Lucknow edition of the *Akbarnámah* (II, 205) has *Aphglaah*.

‡ *Vide Áin Translation*, p. 435. The inscription of a mosque built by him is given below, on p. 105.

§ *Vide Áin Translation*, pp. 400, 516.

ed and resolved to fight. The whole imperial camp did not consist of more than one thousand people; but as so many had been sent over the surrounding country, the number actually present did not exceed two hundred. There were besides about two hundred elephants in the camp. Although the robbers numbered more than four thousand, the emperor gave orders to attack their fortification. But no success was obtained, and the soldiers on account of the heat produced by the conflagration of the houses, climbed up the trees for protection. Akbar mounted on his elephant Dastkár, and rushed forward;* but the fire drove him back, and he rode to the rear of the place. When the elephant entered the narrow street of the village, a man in yellow armour (*jaibak*) appeared on the roof of a house. Akbar took him for Dastam Khán,† who had a similar armour, approached the house in spite of the arrows, pieces of wood, and stones that flew about, and found that the man in yellow was Muqbil Khán, who in pursuing a robber had gone up the roof of a house, where he was surrounded by several dacoits. The emperor at once drove the elephant to the house, and Bandah 'Alí, quzbegi of Mun'im Khán and elder brother to Sultán 'Alí Kháldár, ran up and speared the rebels. At the same time, the forefoot of Akbar's elephant sank into a grain-pit, and Jhujhár Khán, the Faujdár,‡ who was sitting behind the emperor, fell with force upon his Majesty. But Akbar remained cool, managed to get the elephant out of the hole, and at once drove up to the place which the robbers had fortified. Only Rájah Bhagwán Dás and Rájah Bidhí Chand were with the emperor, who had to ask the former for a drink of water. A Hindú struck at Akbar's elephant, and the sword hit the iron rings, which for the sake of beauty are attached to the tusks, in so powerful a manner, that the sparks flew about, and the elephant got wild and trampled the robber to death. Immediately afterwards, a boy of about fifteen years, from fright, threw himself from the roof of a house on the emperor's elephant. Jhujhár Khán was on the point of killing him, when the emperor told him to keep him a prisoner.

When they reached the fortified place, they saw that the officers of the imperial elephants had arrived, but stood perplexed on account of the unexpected extent of the fight. They were now ordered to attack the wall. A Rájput archer aimed seven arrows at the emperor, who caught them with his shield: five of them pierced the shield and passed five and three inches (*ungli*) through the back, and two stuck in the shield without passing through the back. God's protection is quite another shield. 'Aláwal Khán, one of the officers of the elephants, seeing how gallantly the emperor's elephant went forward, called out, "Well done! Who are you? I shall not forget to mention you to his Majesty." Akbar lifted his visor,

* Abul Fazl says that the emperor himself gave him an account of the fight.

† Ain Translation, p. 398. Vambéry spells this name *Dostum*.

‡ *I. e.* an officer in charge of elephants; Ain Translation, p. 126.

shewed his face, and politely thanked 'Alāwal for his good intentions. At the same time Tātār Khān called to the emperor not to expose himself to the shower of arrows; but Jhujhār Khān told him to hold his tongue and not direct the attention of the enemy to the emperor by calling out his name. Akbar, still on the same elephant, now broke down the wall and entered the place, joined by three or four other elephants. A good number of the rebels were killed, whilst others retreated to the house which they barricaded. Akbar gave orders to make a hole in the roof of the house and had fire thrown into it. Nearly one thousand people were thus consumed by the flames of divine fury.

Akbar returned towards evening.

Mr. James in a letter to Mr. Atkinson writes as follows—

'You will remember that some time ago Mr. Blochmann asked you whether you could get a place *پرونکھ* or *برونکھ* identified, where Akbar narrowly escaped with his life in a fight with some dacoits. The story is still known among the people here. It was thus. A certain renowned dacoit stole some of the crown jewels from the palace of Fathpūr Sikri, and fled with them to Paronk'h (*परंख*), a Thākūr village on the Isan in the Mainpūrī district, 9 *kos* south of Sakit. Akbar demanded his surrender, but the Thākūrs refused. On this Akbar came himself with some troops, and besieged Paronk'h. The fort soon capitulated, and the thief was brought bound to the emperor. Then comes a parallel story to that of Col. Blood in Charles II.'s reign. Akbar only complimented the thief on his audacity and rewarded him.

'The remains of the Paronk'h fort, situated in the midst of a kherā, are still visible.'

The following are the inscriptions from Sakit—

1. *Inscription from a mosque built during the reign of Balban* (from a rubbing).

هذا بناء المسجد المباركة في عهد الامام خداوند عالم بارشاه بني آدم غياث الدنيا
والدين ابو المظفر بلبن السلطان يمين خليفة الله ناصر امير المؤمنين خلد الله
ملكه وسلطانه واعلي امره وشانه في ايام قتلى سلطاننا عنا في سنة اربع
وثمانين وستماية ۱۱

This blessed mosque was built in the reign of the Imām, the Lord of the world, the King of mankind, Ghiyāsuddunyā waddīn Abul Muzaffar Balban, the Sultān, the right hand of the Khalīfah, the helper of the Commander of the Faithful—may God perpetuate his kingdom and his rule, and elevate his order and dignity!—in the days of Qutlugh the Royal....., in A. H. 684 [A. D. 1285].

For other Balban inscriptions, *vide* Thomas, *Chronicles*, p. 136; *Proceedings*, A. S. Bengal, May, 1873, p. 94, and the Palam Bāoli Inscription, in the *Journal* for this year.

2. *Inscription from a mosque built during the reign of Sher Sháh (from a rubbing).*

بسم الله الرحمن الرحيم

لا اله الا الله محمد رسول الله يا الله يا رحمن يا رحيم بناء هذه المسجد المباركة في عهد الامام خداوند عالم بادشاه بنى آدم فريد الدنيا والدين ابوالمظفر شيرشاه سلطان عادل خلد الله ملكه ومماطانه واعلي برة وشانه كانت في ايام مسعود خان بن مسعود خان متى قبل الله عايده الساع شهر شعبان سنة سبع واربعين وتسعمائة ۥ

In the name of God, the compassionate and merciful!

There is no God but Allah; Muhammad is God's prophet. O God! O Compassionate! O Merciful!

The building of this blessed mosque took place during the reign of the Imám, the lord of the world, the king of mankind, Faríduddunyá waddín Abul Muzaffar Sher Sháh, the just king,—may God perpetuate his kingdom and his rule and elevate his kindness and dignity!—and it was in the days of Sa'úd Khán, son of Mas'úd Khán,.....on the 7th Sha'bán, 947 A. H. [7th December, 1540].*

3. *Inscription from a mosque built during the reign of Akbar (from a reading).*

بنى هذه المسجد المباركة الشريفة في زمان السلطان الاعظم الخاقان المكرم مولى الملوك العرب والعجم حافظ بالذ الله والناصر عباد الله حامي دين النبي الحجازي جلال الدين محمد اكبر بادشاه غازي خلد الله تعالى ملكه وسلطانه وفاض على العالمين برة وحسانه امر هذا ايات نظام الدين ابراهيم خان بدخشي في شهر شعبان سنة سبعين وتسعمائة كاتب اسماعيل ۥ

This blessed mosque was built in the time of the great king, the honored Kháqán, the lord of the kings of Arabia and Persia, the guardian of God's countries, the protector of the faith of the Arabian Prophet, Jaláluddín Muhammad Akbar Pádisháh Ghází—may God Almighty perpetuate his kingdom and his rule and scatter over the people of the world his kindness and liberality!—and it was ordered.....administration..... of Nizámuddín Ibráhím Khán of Badakhshán, in Sha'bán, 970,.....The writer is Ismá'il. [April, 1563, A. D.]

The builder as was remarked above is called in the A'in Akbarí and the Akbarnámah 'Khwájah Ibráhím Badakhshí.'

4. *Inscription from the Sarái Ag'hat, Sakit (from a reading).*

نهم جمادى الثاني سنة ١٠٩٧ هجرى مطابق سنة ٢٩ عهد بادشاه اورنگزيب غازي جاگیر نواب الهام الله خان عمل فوجدار ميرزا امير بيگ سزاي بنا كرد خضرخان ومحمد خان ورسول خان توبه مرتب شد ۥ

* The Arabic words after Mas'úd Khán seem to be intended for *taqabbala alláhu 'anhu*, 'may God accept it of him!'

On the 9th Jumáda II., 1097 A. H., in the 29th year of the reign of Aurangzib Gházi, when Nawáb Ilhám ullah was the jágirdár, and Mirzá Amír Beg was the Faujdár, this Sarái was established. It was built by Khizr Khán, Muhammad Khán, and Rasúl Khán Túyah.* [23rd February, 1686.]

Thus it would appear that Mirzá Amír Beg was Faujdár of the district in 1686. His name is not mentioned in the meagre sources for Aurangzib's reign. Ilhámullah Khán is once incidentally mentioned in the *Muásir i 'Alámگیر* (p. 249) as having served in the 28th year of the emperor's reign in the Dak'hin.

The Sarái alluded to is also called Sarái 'Abdurrasúl.

Mr. Ball, on behalf of Mr. A. O. Hume, C. S., C. B., exhibited some new species of birds and read the following description of them:—

New species of Birds exhibited and characterized by MR. A. O. HUME, C. S., C. B.

I beg to exhibit specimens of a few, as I believe, new species of birds.

The first is a Jay; a *Garrulus*, of the same type as the well known *G. glandarius* of Europe. I propose for it the name of—

(1.) *GARRULUS LEUCOTIS*, its snowy white ear coverts being amongst its most characteristic features. The forehead, lores, orbital region, ear coverts, chin and throat are pure white, there is an enormously broad, but rather short black moustachial stripe. The anterior portion of the crown white, the feathers centered with blackish brown. The posterior portion of the crown, occiput and nape black. Not only the greater primary coverts but also the outer webs of the secondary quills are strongly barred in the usual Jay fashion.

Length 12·5—W. 6·55.

The next is a green Woodpecker, recalling in some points, *striolatus* and *vittatus*, but differing conspicuously from all known *Gecini*, and for this I propose the name of—

(2.) *GEVINUS NIGRIGENIS*. The entire top, back and sides of the head and nape black, in the female, in the male similar, but the crown crimson. Chin, throat, sides of neck and breast, bright turmeric yellow. Abdomen and rest of lower and upper parts much as in *striolatus* but rump crimson. Length of male, 12·82. Wing, 6·4.

Then we have a most lovely *Arboricola*, the most beautiful of the group, which I owe to that indefatigable ornithologist, L. Mandelli, Esq. and which I propose to name after him—

(3.) *ARBORICOLA MANDELLII*. Very few words will suffice to characterize this species. It belongs to the same type, as *rufogularis*, Hodg. and

* The word *Túyah* is unclear to me; but as it stands after the name, it must be a family distinction, unless it be a wrong reading.

intermedia, Blyth, in that the feathers of the upper back and interscapular region, are neither barred nor fringed with black. The forehead is a deep maroon chestnut, the crown and occiput a rich ruddy olive. The chin, throat, ear-coverts and sides of the neck bright chestnut, the two latter streaked with black; a broad black line sharply defines the chestnut of the throat; in the centre of the base of the throat, there is a snow-white patch, immediately above the black border line. Below this latter the breast is a rich maroon chestnut.

The rest of the bird closely resembles the species already referred to. Length about 8.5; wing 4.75.

A new species of *Gampsorhynchus* may be designated,

(4.) *GAMPSORHYNCHUS TORQUATUS*. Much resembles *rufulus*, but is rather smaller, has a slightly smaller bill, is somewhat more warmly coloured. The white of the head does not extend backwards beyond the crown, nor that of the throat on to the breast. A deep rufous brown band bounds the white of the head every where, being deepest and most conspicuous across the base of the throat where it forms a regular and most marked collar, below this collar the rest of the lower parts are a light rufous buff.

Length, 9.5—Wing, 3.75.

The last bird I describe with some hesitation; it is a *Leiothrix* form, allied to *Minla* and *Proparus* but distinct from all known species, I believe, of this group. My only reason for doubt is this. In some particulars it closely resembles Mr. Mandelli's *Minla rufogularis*, (*STRAY FEATHERS*, Vol. I, p. 416), but it is longer, has a smaller wing rather, entirely wants the rusty red throat, and the black and white bands continued over the forehead, which bands in our bird do not extend further forward than the middle of the eye. In other respects, Mr. Mandelli's description would apply fairly well. Could it be that my bird is the female, *Rufogularis* the male? Amongst the species comprised in the various subgenera which may all be included in the genus *Leiothrix*, there are never marked differences in the sexes. Again both Mr. Mandelli and Mr. Brookes, placed *rufogularis* as a *Minla* (I have not myself seen a specimen) whereas, this present bird, is a typical *Proparus* with a still stronger and more Parian bill than *vinipectus*. I think myself it may on the whole for the present be named and I designate it—

(5.) *PROPARUS DUBIUS*. I need only add that the length is 5.5; the wing 2.05; and the tail 2.35, and that besides the differences already pointed out, the plumage of this species further differs from *rufogularis*, in wanting the "crescentic patch of bright fulvous white beyond the ear-coverts," and in having the chin, throat, breast and abdomen pale fulvescent, the flanks and lower tail coverts olivaceous, and the tibial plumes dull pale rufescent.

I take this opportunity of noting that as I find that Col. Tytler's name "*affinis*" for the Andaman Paroquet, which I have recently shown to be distinct from *erythrogenys*, Blyth, from the Nicobars, cannot stand, that name having already been assigned by Mr. Gould to another species of the same genus, I have named the Andaman bird, *P. Tytleri* in memory of my late friend who did so much towards the elucidation of the avi-fauna of the Andaman Islands.

May, 6th, 1874.

The following papers were read.

1. *Notes on a hoard of 513 Sassanian Coins in the possession of Col. H. Hyde, R. E.*—By THE HON'BLE E. C. BAYLEY, C. S. I.
This paper will be published in the Journal, Part I.
2. *Memorandum on the Operations of the Archaeological Survey for season 1873-74.* By MAJOR GENERAL A. CUNNINGHAM, R. E., C. S. I.

During the working season which is just now closed, the greater part of the Central Provinces has been explored by my assistant Mr. Beglar and myself, he taking the Eastern half and I the Western half—the division being broadly marked by the high road through Jabalpur and Seoni to Nāgpur.

At Jabalpur we examined together the old temple at Bhera Ghát, overhanging the marble rocks. The present temple is small, and apparently a re-construction of part only of the original building; but the circular colonnade which surrounds the temple, with its long line of female statues, all of life-size, is one of the most curious and perfect specimens of Hindu architecture that I have yet met with. The temple and its surrounding statues are dedicated to the worship of Siva; but from the discovery of a single small statue with the well known Buddhist creed, *Ye Dhamma hetu*, &c., inscribed on the pedestal, I have little doubt that this circular colonnade must originally have enclosed a Buddhist stupa. Each of the female statues has the name engraved on the pedestal, and from the shapes of the letters of these records I would assign the destruction of the Buddhist works and the establishment of the Saiva temple to the ninth or tenth century.

To the north of Jabalpur I explored the ruined temples of Bilahari and of Karnpur near Kári Talai, and obtained good copies of the Asoka inscription on the rock at Rúpnáth. Through the kindness of Mr. C. Grant, Commissioner of Jabalpur, I obtained two copper plate inscriptions containing a land grant of Raja Jayanátha, dated in Samvat 174, which were found at Karnpur.

To the west of Jabalpur I explored the decayed city of Burhānpur, where I made plans of the Jāmi and Bibi Masjids—the former being one of the finest Muhammadan buildings in India. It contains a long inscription of

Adil Shah Fārūki with a Sanskrit translation, and also a record of Akbar mentioning his conquest of Khandes and the Dakhin. From Asirgarh I got a second similar record of Akbar, with an inscription of his son Dāniyāl, and others of Shah Jahan and Aurangzib.

To the south I explored the Buddhist caves and Brahmanical temples at Bhāndak, to which place I am now able to restore a long and valuable inscription of the sixth or seventh century, the fine spot of which was unknown. I visited also the colossal sculptures at Lālpēt, outside the walls of Chānda, of which the largest measures no less than $26\frac{1}{2}$ feet in length by 18 feet in breadth and 3 in thickness at the base. I calculate its weight at upwards of 80 tons. The sculpture represents the goddess Durgā, with ten heads, ten arms, and ten legs. On the pedestal there is a bas-relief of Siva performing *tapasya*, or ascetic penance.

Fifty miles to the eastward of Chānda and about 120 miles to the south of Nāgpur I visited the famous group of temples at Mārkaṇḍa, on the Wen-Gangā river. The principal temple of Mārkaṇḍa Rishi is of the same type as the great temples at Khajurāho in Bundelkhand, the outside being decorated with three rows of statues below and four rows above. Unfortunately this temple was struck by lightning about 200 years ago, which destroyed the upper half of the tower and the roofs of the *māhamandapa*, or main hall, and its side porches. The temple was dedicated to Siva. It is surrounded by about a dozen other temples of the same god under different titles, with a long cloister temple in the back wall of the enclosure, which is dedicated to the ten Avatārs of Vishnu. The sculptures are of the same style as those of Khajurāho, but without their indecency. The temples may be assigned to the ninth and tenth century, but there are remains of former buildings, as well as a broken pillar with an inscription of an earlier date.

On the northern frontier of the Central Provinces I explored the small States of Mahiyar (Myhere) and Nagod. In the former State there is an old temple dedicated to Saraswati, on the top of a lofty conical hill, three miles to the west of the town. The enshrined figure of the goddess has an inscription of four lines on the pedestal, and outside there is a long inscription of 39 lines which is unfortunately much worn by the weather. It opens with an invocation to Saraswati.

In the State of Nagod, which was formerly called *Uchahara*, there are several ancient sites, one of which, named Dhaniya-Majgowa, has yielded a number of copper-plate inscriptions, of which eight are now in the possession of the Raja of Nagod. These records belong to two different families of petty chiefs, of whom the principal representatives are Raja *Hastina* and his sons Sakshabhāna and Sarvvanātha in one line, and Raja Jayanātha and his son Sarvvanātha in the other line. At *Bhubhara*, twelve miles to the

west-north-west of Uchahara, I obtained a short record of the last named prince inscribed on a stone pillar.

But the most interesting remains are at *Bharahut*, six miles to the north-east of Uchahara, nine miles to the south-east of the *Sutna* Railway station, and 120 miles to the south-west of Allahabad. In our maps the place is called *Bharaod*, and I believe that it may be identified with the *Bardaotis*, of Ptolemy. It is the site of an old city, which only sixty years ago was covered with a dense jungle. In the midst of this jungle stood a large brick stupa, 68 feet in diameter, surrounded by a stone railing, 88 feet in diameter and nine feet in height. The whole of the stupa has been carried away to build the houses of the present village; but rather more than half of the stone railing still remains, although it has been prostrated by the weight of the rubbish thrown against it when the stupa was excavated. When I first saw the place only three of the railing pillars near the eastern gate were visible above the ground, but a shallow excavation soon brought to light some pillars of the south gate, from which I obtained the measurement of one quadrant of the circle. I was thus able to determine the diameter of the enclosure, the whole of which was afterwards excavated, partly by myself and partly by my assistant Mr. Beglar. In many places the accumulation of rubbish rose to eight feet in height, and as the stone pillars were lying flat underneath this heap, the amount of excavation was necessarily rather great; but the whole work did not occupy more than six weeks, and all that now exists of this fine railing is now exposed to view.

This colonnade of the *Bharahut* stupa is of the same age and style as that of the great *Sanchi* stupa near *Bhilsa*. But the *Sanchi* railing is quite plain, while the *Bharahut* railing is profusely sculptured,—every pillar and every rail as well as the whole coping being sculptured on both faces, with an inscription on nearly every stone. From the characters of these inscriptions, as in the similar case of the *Sanchi* stupa, the erection of the railing must be assigned to the age of *Asoka*, or about B. C. 250.

The inscriptions are mostly records of the gifts of pillars and rails, like those of the *Sanchi* and other stupas. But there is also a considerable number of descriptive records, or placards, placed either above or below many of the sculptures. These last are extremely valuable, as they will enable us to identify nearly all the principal figures and scenes that are represented in these ancient bas-reliefs.

Amongst the numerous sculptures at *Bharahut* there are no naked figures as at *Sanchi* and at *Mathura*, but all are well clad, and especially the women, whose heads are generally covered with richly-figured cloths, which may be either muslins, or perhaps brocades or shawls. Most of the figures, both male and female, are also profusely adorned with gold and jewelled ornaments, in many of which one of the most significant Buddhist symbols

plays a prominent part. The earrings are mostly of one curious massive pattern which is common to both men and women. The *ankús*, or elephant goad, was also a favourite ornament, which is placed at intervals in the long necklaces of ladies.

At each of the four entrances the corner pillars bore statues, each $4\frac{1}{2}$ feet in height, of *Yakshas* and *Yakshinis* and of *Nāga Rajas*, to whom the guardianship of the gates was entrusted. Thus at the northern gate there are two male figures and one female, which are respectively labelled *Ajakā-laka Yakho*, *Kupiro Yakho*, and *Chadā Yakhi*, that is, the Yakshas named *Ajakā-laha* and *Kupira* and the Yakshini *Chandā*. Other Yakshas are named *Suviloma*, *Virudaka* and *Gangito*, and a second Yakshini is labelled *Yakhini Sudasana*. On two other pillars there are male figures, each with a hood canopy of five snakes' heads and each labelled *Nāga Raja*. These have their arms crossed upon their breasts in an attitude of devotion appropriate to their appearance on a Buddhist building. On two middle pillars there are two female statues respectively labelled *Chukaloka Devatā* and *Sirimā Devatā* whom I take to be goddesses.

Amongst the scenes represented there are upwards of a dozen of the Buddhist legends called *Jātakas*, all of which relate to the former births of Buddha. Luckily these also have their appropriate inscriptions; or descriptive labels, without which I am afraid that their identification would hardly have been possible. Amongst these *Jātakas* are the following:

(1.)—*Hansa Jātaka*, or "Goose-birth," of which the only portion now remaining below the inscription is the expanded tail of a peacock, which must therefore have played some part in the story.

(2.)—*Kinara Jātaka*. The Kinaras were a kind of demi-gods. Here two of them, male and female, are represented, with human heads and clad in leaves, standing before some human personage who is seated. The assignment of horses' heads to the Kinaras must therefore belong to a later date.

(3.)—*Miga Jātaka*, or the well known legend of the "Deer," in Sanskrit *Mṛiga*. I call it a deer and not an antelope, as is generally understood, because all the animals in this bas-relief are represented with antlers. The king of Kāsi is seen aiming an arrow at the King of the Deer (Buddha).

(4.)—*Maghā-Deviya Jātakam*, or "Magha Devi-birth," I know nothing of this story.

(5.)—*Yava Mājhakiyam Jātakam*. This title means literally the "mean or average amount of food," which was attained by daily increasing the quantity with the waxing moon and decreasing it with the waning moon. I know nothing of the story, but the bas-relief shows a king seated with baskets of grain (?) before him, each bearing a stamp or medallion of a human head. To the left some men are bringing other baskets. Barley (*yava*) would appear to have been the principal food in those days.

(6.)—*Bhisaharaniya Jātaka.* A *rishi* (or sage) is seated in front of his hut, with a man and woman standing before him, and a monkey seated on the ground, who is energetically addressing the sage.

(7.)—*Latwa-Jātaka.*—The “Latwa-bird-birth.”—This legend apparently refers to some story of a bird and an elephant, of which I heard a curious version in Kashmir in 1839. In the bas-relief there is a bee stinging the eye and a bird pecking the head of an elephant, with a frog croaking close by, while the elephant is treading on a nest of young birds. To the right the same (or a similar) bird is sitting on the branch of a tree over an elephant who is running away with his tail between his legs. Near the top the hind half of an elephant is seen rushing down some rocks. In my Kashmiri version an elephant while feeding throws down a nest of young birds into a stream, where they are all drowned. The parent bird seeks the aid of the bees and mosquitoes, who attack the elephant with their stings, and having half blinded him he rushes off towards the stream, and plunging headlong down the rocks is drowned. The fable seems intended to show the power of combination. There can be no doubt that the two legends are substantially the same; and it seems probable that we may find other Buddhist *Jātakas* still preserved in modern legends after the lapse of more than 2,000 years. Perhaps this particular legend may be found in the *Pancha Tantra*.

(8.)—*Vitura punakaya Jātaka.*—I know nothing of this story *Vitura* may perhaps be a mistake for *Vithurá* “a thief.”

Of illustrations of the life of Buddha during his last appearance there are some good examples. The earliest of these is a medallion containing Māyā's dream of the white elephant, which is superscribed *Bhagavato Ukdanti*. A second scene belongs to the reign of *Ajāta Satru*, King of Magadha, in the eighth year of whose reign Buddha attained *Nirvāna*. This is labelled—

Ajātasata Bhagavato vandate.—Some of the well known assemblies of the Buddhists would also appear to be represented, of which one is called the *Jatila Sabha*, of which I know nothing. A second belongs, I think, to a later period of Buddhist history, about midway between the death of Buddha and the reign of Asoka. This sculpture represents a large assembly and is duly labelled—

Sudhamma Reva Sabha Bhagavato Chudā Mahā.—The words *Reva Sabha* I take to mean the assembly or synod which was presided over by the famous Buddhist Priest Revato just 100 years after the death of Buddha, or in B. C. 378.

But the Bharahut sculptures are not confined to the legends and events connected with the career of Buddha, as there is at least one bas-relief which illustrates a famous scene in the life of Rāma. In this sculp-

ture there are only three figures, of which one seated to the left is holding out an arrow towards a male and female who stand before him—the latter being behind the other. These figures are labelled respectively *Rāma* (the rest lost, but most probably *Chandra*), *Janaka Rāja* and *Sītala Devi*. I believe that this is by far the earliest notice that we possess of the great solar hero *Rāma* and his wife.

I look upon the discovery of these curious sculptures as one of the most valuable acquisitions that has yet been made to our knowledge of ancient India. From them we can learn what was the dress of all classes of the people of India during the reign of Asoka, or about three quarters of a century after the death of Alexander the Great. We can see the Queen of India decked out in all her finery, with a flowered shawl or muslin sheet over her head, with massive earrings and elaborate necklaces, and a petticoat reaching to the midleg, which is secured round the waist by a zone of seven strings, as well as by a broad and highly ornamented belt.

Here we can see the soldier with short curly hair, clad in a long jacket, or tunic, which is tied at the waist, and a *dhoti* reaching below the knees, with long boots, ornamented with a tassel in front just like Hessians, and armed with a straight broad sword, of which the scabbard is three inches wide.

Here also we may see the standard-bearer on horseback with a human-headed bird surmounting the pole. Here, too, we can see the king mounted on an elephant escorting a casket of relics. The curious horse-trappings and elephant-housings of the time are given with full and elaborate detail.

Everywhere we may see the peculiar Buddhist symbol which crowns the great stupa at Sānchi used as a favourite ornament. It forms the drop of an earring, the clasp of a necklace, the support of a lamp, the crest of the royal standard, and the decoration of the lady's broad belt and of the soldier's scabbard.

There are also houses of many kinds, and several temples, one of which is labelled *Vijayata pásāde*, or the "Temple of Victory." There are animals of several kinds, as elephants, horses, deer, cows, and monkeys, and a single specimen of a real tapir. There are numerous crocodiles and fishes, and in one sculpture there is a very large fish, which is represented swallowing two boat-loads of men. There is also a great variety of flowers, and several kinds of fruits, amongst which the mangoe is very happily treated.

But perhaps the most curious of the Bharahut sculptures are a few scenes of broad humour, with elephants and monkeys as the only characters. In two of these an elephant has been captured by a band of

monkeys, who have fastened a billet of wood along the inside of his trunk so as to prevent him from moving it. Ropes are fastened to his neck and body, the ends of which are pulled by monkeys, who are walking and dancing in triumphal procession to the sound of shells and cymbals played by other monkeys. The spirit of these scenes is very droll. A third scene represents the monkeys holding a giant by the nose with a pair of pincers, to which is fastened a rope dragged by an elephant. The action and attitudes of the monkeys are very good. The intention of all these designs is exceedingly spirited, but the execution is coarse and weak.

In the short inscriptions on the railing of the Bharahut stupa I find the names of the following places, *Sugana*, or *Srughna*; *Vedisa*, or *Bhilsa*; *Pátaliputra*, or *Patna*; *Kosámbi*, or *Kosam*; *Nandinagarika*, or *Nander*; and *Násika*, or *Násik*; besides a number of unknown places, of which *Asitamasá* is most probably some town on the river *Tamasá* or *Tamas*, the Tons of our maps.

From these inscriptions also I have learned the names of several parts of the Buddhist gateways and railings, one of which is a new word, or at least a new form of word, not to be found in the dictionaries.

On the top of *Lál Pahár*, or the "Red Hill," which overhangs Bharahut, I obtained a rock inscription of one of the great *Kalachuri* Rajas, Nara Sinha Deva, dated in Samvat (Sake) 909. Altogether Mr. Beglar and I have collected about twenty inscriptions of the *Kalachuris*, who took the titles of *Chedindra* and *Chedinarendra*, or "Lord of Chedi," and called the era which they used the *Chedi Samvat* and the *Kalachuri Samvat*.

I have also got an inscription of the great Chalukya Raja Tribhuvana Malla, who began to reign in A. D. 1076 and reigned 51 years. The inscription is dated in Sake 1008, or A. D. 1086, and the place of its discovery, Sitabalđi, confirms the account of his having conducted an expedition across the Narbada.

After leaving Bharahut I visited Kosam on the Jumna, which I have formerly identified with the ancient Kosámbi. I explored the place very minutely, and my three days' search was rewarded by the discovery of several very curious terra-cotta figures, which are certainly as old as the period of Buddhist supremacy, as the common Buddhist symbol forms an ornament, both for males and females, as in the Bharahut sculptures which I have just before described. Unfortunately there are no inscriptions upon them. Some of them were undoubtedly toys. Such are two rams' heads with a hole from side to side for an axle and a hole at right angles behind for the insertion of a pole, so that they might be rolled forward on wheels to butt against each other. Such also are four carts or chariots with similar perforations, and with harnessed oxen represented on the

fronts. One of them has four oxen, the others only two. These I take to be authentic specimens of the ancient Toy-cart, or *Mrichhakatī*, which gave its name to one of the oldest of the Hindu dramas translated by H. H. Wilson.

A. CUNNINGHAM, *Major-General,*
Director General of the Archæological Survey of India.

SIMLA, the 13th April, 1874.

Bharahut.—A further examination of the inscriptions, and the receipt of Mr. Beglar's report of the completion of the excavations, have made several very valuable additions to my account of the *Bharahut* sculptures of which I will now give a brief description.

A bas-relief, labelled with the name of *Pasenajita*, shows the well-known King of Kosala in a chariot drawn by four horses proceeding to pay his respects to the Buddhist Wheel symbol, which is appropriately named *Bhagavato dhamma cakam*.

A second bas-relief represents a Nāga Chief kneeling before the Bodhi Tree, attended by a number of Nāga followers. This scene is named *Erapāto Nāga Rāja Bhagavato vandato*, that is, "Erapātra, the Nāga Raja, worships Buddha."

The following *Jātakas* have also been found by Mr. Beglar: (1) Uda Jātaka, (2) Seneha Jātaka, (3) Birila (read Birāla) Jātaka—(or) Kukuta Jātaka,—(4) Isimibo Jātaka, (5) Nāga Jātaka, and (6) Chhadantiya Jātaka.

A single bas-relief gives a party of female dancers attended by female musicians. The attitudes are the same as at the present day; but the four female dancers are intended for *Apsaras*, as they are separately labelled,—*Alambusa Achharā*, *Subhada Achharā*, *Padumānati Achharā*, and *Misakosi Achharā*.

There are also representations of five separate Bodhi Trees of as many different Buddhas, which are distinctly labelled as follows:

- (1.)—*Bhagavato Vipāsino Bodhi*, that is, the Tree of *Vipasyin* or *Vipasī*, the first of the seven Buddhas.
- (2.)—*Bhagavato Kakusadhasa Bodhi*.
- (3.)—*Bhagavato Konagamāns Bodhi*.
- (4.)—*Bhagavato Kasapasa Bodhi*.
- (5.)—*Bhagavato Sakamunino Bodhi*.

These last are the four well known Buddhas named *Krakuchhanda*, *Konagamāni*, *Kāsyapa*, and *Sākyamuni*.

But by far the most interesting of all Mr. Beglar's discoveries is a bas-relief representing the famous *Jetavana* monastery at Srāvastī. The scene is labelled *Jetavana Anādhapadiko datī kotī santhātana ketā*, which I

take to mean that "Anáthapindika buys (*ketá*) the Jetavana for certain *kotis* of money." To the left there is a building labelled *Kosambikuti*, a name which has already appeared in my Srávasti inscription. A second building near the top is labelled *Gadhakuti* or *Gandhakuti*. In the foreground there is a cart which has just been unladen, with the pole and yoke tilted upwards, and the bullocks at one side. The story of the purchase of Prince Jeta's garden by Anáthapindika for eighteen *kotis* of *masurans* is told in Hardy's Manual of Buddhism. According to the legend Prince Jeta, not wishing to sell the garden, said that he would not part with it for a less sum than would paye the whole area when the pieces of money (*masurans*) were laid out touching each other. This offer was at once accepted by Anáthapindika, and accordingly the court-yard is represented covered with ornamented squares, which touch each other like the squares of a chess board, but do not break bond as a regular pavement of stones or tiles would do. For this reason I take the squares to represent the squares pieces of old Indian money. Beside the cart there are two figures with pieces in their hands. These I suppose to be Anáthapindika himself and a friend counting out the money. In the middle of the court are two other figures also with square pieces in their hands. These I suppose to be the purchaser's servants who are laying down the coins touching each other. To the left are several persons of rank looking on, whom I take to be Prince Jeta and his friends. The whole scene is very curious; and when we remember that the bas-relief is as old as the time of Asoka, it does not seem too rash to conclude that we have before us a rude representation of the buildings of the famous Jetavana which were erected by Anáthapindika during the lifetime of Buddha.

One of the new inscriptions discovered by Mr. Beglar is also interesting, as we get the name of a king who must have been a contemporary of Asoka. This record is as follows: "(Gift) of the Prince Vádha Pála, son of Raja Dhanabhuti."

A. CUNNINGHAM, *Major-General,*
Director General of the Archaeological Survey of India.

3. *Fourth List of Birds, principally from the Nága Hills and Manipúr, including others from the Khási, Gáro and Tippera Hills.*—By MAJOR H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S.

This paper will be published in the Journal, Part II.

LIBRARY.

The following additions have been made to the Library since the meeting held in April last.

Presentations.

* * * Names of Donors in Capitals.

Proceedings of the Institution of Mechanical Engineers, Birmingham, 29th and 30th July, 1873, Cornwall Meeting, Part I.

THE INSTITUTION.

Proceedings of the Literary and Philosophical Society of Liverpool, No. XXVII.

Alfred Morgan.—On Gems and Precious Stones. *R. C. Johnson*.—The Exploration of Mouab.

THE SOCIETY.

Proceedings of the Royal Society, Vol. XXI, No. 147, Vol. XXII, No. 148.

No. 147. *W. N. Hartley*.—On the Optical Properties of a new Chromic Oxalate. *J. N. Lockyer*.—On the Quantitative Analysis of certain Alloys by means of the Spectroscope. *J. N. Lockyer*.—Researches in Spectrum-Analysis in connexion with the Spectrum of the Sun.

No. 148. *Professor J. Thomson*.—A Quantitative Investigation of certain relations between the Gaseous, the Liquid and the Solid States of Water-Substance. *W. Crookes*.—On the action of Heat on Gravitating Masses.

THE ROYAL SOCIETY OF LONDON.

Proceedings of the Royal Geographical Society, Vol. XVII, Nos. 3, 4, 5. Vol. XVIII, No. 1.

Vol. XVII, No. 3. *Elias*.—Journey through Western Mongolia. *Bower and Goldsmid*.—Memorandum and Notes on the Route from Shahrūd to Astrabad &c. *Shaw*.—Miscellaneous Notes on Eastern Turkistan. *Johnson and Montgomerie*.—Meteorological Observations taken at Lé and remarks thereon.

No. 4. *Major-General Sir H. C. Rawlinson*.—President's Address at the Anniversary Meeting.

No. 5. *Wilson*.—Recent Surveys in Sinai and Palestine.

Vol. XVIII, No. 1.—*Moresby*.—Recent discoveries in the South-eastern part of New Guinea. *Gill*.—Three visits to New Guinea. *Elias*.—Captain Prshewalsky's Explorations in Mongolia and Northern Thibet.

THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

The Quarterly Journal of the Geological Society. Vol. XXX, No. 117.

Lieut. A. W. Stiffe.—On the Geology of the Mekran Coast.

THE GEOLOGICAL SOCIETY OF LONDON.

The Journal of the Chemical Society, Nov. and Dec., 1873, Jan., 1874. Dec., 1873. *D. Howard*.—On the Optical Properties of some Modifications of the Cinchona Alkaloids.

January, 1874. *W. J. Russell*.—On the action of Hydrogen on Silver Nitrate.

THE CHEMICAL SOCIETY OF LONDON.

Journal of the Statistical Society, Vol. XXXVI, Part IV, Dec., 1873.

THE STATISTICAL SOCIETY OF LONDON.

Journal of the East India Association, Vol. VII, No. 3.

THE ASSOCIATION.

Hand List of the Edentate, Thick-Skinned and Ruminant Mammals in the British Museum, by Dr. J. E. Gray.

THE BRITISH MUSEUM.

Ocean Highways. January, 1874.

Yemen. *Baron F. von Richthofen*.—Recent attempts to find a direct Trade-Road to South-western China.

THE EDITOR.

Journal Asiatique. Nos. 7, 8, 1873, No. 1, 1874.

1873, No. 7. *M. E. Renan*.—Une nouvelle inscription nabatéenne. *M. T. Gilbert*.—Note sur les sectes dans le Kurdistan.

No. 8. *M. A. Causin de Perceval*.—Notices anecdotiques sur les principaux musiciens Arabes.

1874, No. 1. *M. Dabry de Thiersant*.—De l'insurrection mahométane dans la Chine occidentale. *Garrez*.—Ouvrages publiés par les Parsis de Bombay.

THE ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, Février, 1874.

THE GEOGRAPHICAL SOCIETY OF PARIS.

Bulletin de la Société d'Anthropologie de Paris, 1873, Avril et Mai.

THE ANTHROPOLOGICAL SOCIETY OF PARIS.

Zeitschrift der Deutschen Morgenländischen Gesellschaft. Bd XXVII. Heft IV.

Th. Nöldeke.—Zwei syrische Lieder auf die Einnahme Jernsalems durch Saladin. *Dr. O. Blau*.—Vergessene punische Glossen. *M. Steinschneider*.—Zu Kalila we-Dimna. *O. Boettlingk*.—Einige Bemerkungen zu den von Th. Aufrecht veröffentlichten Sprüchen aus Çarigadharā's Paddhati. *F. Pratorius*.—Unsterblichkeitsglaube und Heiligenverehrung bei den Himjaren. *F. Spiegel*.—Zur Erklärung des Avesta. *Dr. O. Donner*.—Ueber die Wurzelbildung in den Finnisch-Ugrischen Sprachen.

THE GERMAN ORIENTAL SOCIETY, LEIPSIK.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, Januar, 1874.

Steinzer und Weber.—Über Nilakantha's Rösselsprung.

THE ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Bulletin de la Société Impériale des Naturalistes de Moscou, 1873, No. 2.

Alex. Becker.—Reise nach Baku, Lencoran, Derbent, Madschalis, Kasum Kent, Achty.

Fou Victor Motschoulsky.—Enumeration des nouvelles espèces de Coléoptères rapportés de ses voyages. (describes some Indian species).

THE IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

The Unchaste Hindu Widow, Part I, by Prannath Pandit.

THE AUTHOR.

Übersicht der von mir auf Neu-Guinea und den Inseln Jobi, Mysore und Mafoor im Jahre 1873 gesammelten Amphibien von Dr. A. B. Meyer.

THE AUTHOR.

Anthropologische Mittheilungen über die Papuas von Neu-Guinea,—I, Aeusserer physischer Habitus, von Dr. A. B. Meyer.

THE AUTHOR.

A collection of 8 papers by Isaac Lea, LL. D.

Notes on Microscopic Crystals included in some Minerals—Further notes on the same—Descriptions of six new species of Fresh-water Shells—Descriptions of new species of Unionidae, Exotic and of the United States.

THE AUTHOR.

Numismatic and other Antiquarian Illustrations of the Rule of the Sassanians in Persia, A. D. 226 to 652, by E. Thomas.

THE AUTHOR.

Indische Alterthumskunde, von C. Lassen. Bd. 2.

THE AUTHOR.

Catalogus Codicum Orientalium Bibliothecae Academiae Lugduno-Batavae, M. J. De Goeje, Vol. 5.

THE AUTHOR.

The Calcutta Journal of Medicine, 1874, Nos. 1-3.

THE EDITOR.

General Report on the Topographical Surveys of India for 1872-73.

THE SURVEYOR GENERAL OF INDIA.

Report on the Judicial Administration of the Central Provinces for 1873.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Report on the Administration of the North Western Provinces for 1872-73.

THE GOVERNMENT OF THE N. W. PROVINCES.

Selection of Papers regarding the Hill Tracts between Assam and Burmah and on the Upper Brahmaputra.

THE GOVERNMENT OF BENGAL.

Annals of Indian Administration, Parts 1 and 2, 1871-72.

THE GOVERNMENT OF BENGAL.

Report on the Cultivation of Jute, with a map.

THE GOVERNMENT OF BENGAL.

General Report on the Revenue Survey Operations of the Upper and Lower Circles for 1872-73.

THE GOVERNMENT OF INDIA.

Report on the Tribes &c. around the shores of the Persian Gulf, by Lieut.-Col. Pelly.

THE GOVERNMENT OF INDIA.

Exchange.

The Indian Antiquary, April 1874.

M. J. Walhouse.—Archæological Notes. *Major J. W. Watson.*—Anecdote of Rão Máldeva of Jodhpur. *A. K. Nairne.*—Musalmán remains in the South Konkan. *J. Muir.*—Professor Lassen on Weber's Dissertation on the Rāmāyana. *A. F. R. Hærle.*—Notes on some Prosodical peculiarities of Chánd. *Capt. E. W. West.*—Are the Maráthás, Kshatreyas or Súdras? *W. Ramsay.*—Notes from the North-West. *Col. H. Yule.*—The Geography of Ibn Batuta's Travels in India. *E. Rehatsek.*—The Establishment of the Royal City Herat and its dependencies.

The Athenæum, November and December, 1873, January, 1874.

Nature, Nos. 227-231.

Purchase.

Pratnakamra Nandini, No. XII.

The American Journal of Science, Vol. VI, No. 36, Vol. VII, No. 37.

No. 36. *H. Draper.*—On Diffraction-Spectrum Photography. *H. A. Rowland.*—On the Magnetic permeability and the Maximum of Magnetism of Iron, Steel and Nickel. No. 37. *M. Carey Lea.*—On a Combination of Silver Chloride with Mercuric Iodide.

Comptes Rendus, Vol. LXXVII, Nos. 20-26, Vol. LXXVIII, Nos. 1-6.

Vol. LXXVII, No. 20. *M. Chevreul.*—Action de l'eau pure sur divers métaux. *M. Lecoq de Boisbandran.*—Sur quelques spectres métalliques (plomb, chlorure d'or, thallium, lithium.)

No. 21. *M. Marié-Davy.*—Observations à propos d'une Note récente de M. Reye, sur les analogies qui existent entre les taches solaires et les tourbillons de notre atmosphère. *M. A. Poëy.*—Sur les rapports entre les taches solaires et les ouragans des Antilles, de l'Atlantique nord et de l'Océan Indien sud.

No. 22. *M. A. Bobierre.*—Sur les diverses conditions dans lesquelles le plomb est attaqué par l'eau.

No. 23. *MM. Ch. Legros et Onimus.*—Expériences sur l'emploi de la galvanocaustie dans les opérations chirurgicales.

No. 24. *M. Branly.*—Évaluation en unités mécaniques, de la quantité d'électricité que produit un élément de pile.

No. 26. *M. Alph. Milne Edwards.*—Observations sur l'existence de certains rapports entre le mode de coloration des Oiseaux et leur distribution géographique.

Vol. LXXVIII, No. 5. *M. A. Bobierre.*—Des conditions dans lesquelles le plomb est attaqué par l'eau.

No. 6. *M. Balard.*—Action de l'eau sur le plomb.

Journal des Savants, Nov. Dec., 1873, Jan., 1874.

Nov., 1873. *J. Bertrand.*—Les étoiles filantes.

Dec., 1873 and Jan., 1874. *A. de Quatrefages.*—Étude sur les Todas.

Revue et Magasin de Zoologie, 1873, No. 12.

Revue Archéologique, Nov. Dec., 1873, Jan., 1874.

Revue des Deux Mondes, 1st Dec., 1873—15th Febr., 1874.

The History of India as told by its own Historians, by Sir H. M. Elliot, Vol. V.

The Quarterly Journal of Science, Jan., 1874.

M. Pouton.—On the relation between Refracted and Diffracted Spectra. *S. Barber*.—Observations on the Optical Phenomena of the Atmosphere.

Quarterly Journal of Microscopical Science, Jan., 1874.

The Ibis, Jany., 1874.

P. L. Slater.—On the Prionochili of British India. *Lieut. W. V. Legge*.—On the Distribution of Birds in the Southern Hill-region of Ceylon. *W. T. Blanford*.—Notes on the Synonymy of some Indian and Persian Birds with Descriptions of two new Species from Persia. *W. E. Brooks*.—Notes on some European and Asiatic Eagles.

The Numismatic Chronicle, 1873, Part 3.

Major-Genl. A. Cunningham.—Coins of Alexander's Successors in the East. *E. Thomas*.—Sassanian coins. *S. E. L. Poole*.—On the Coins of the Urtukis.

The London, Edinburgh and Dublin Philosophical Magazine, Nos. 308—310, Dec., 1873, Jan., Feb., 1874.

No. 308. *H. Draper*.—On Diffraction-Spectrum Photography. *A. W. Bickerton*.—On a new Relation between Heat and Static Electricity. *J. C. Maxwell*.—A Discourse on Molecules. *O. Heaviside*.—On the Differential Galvanometer. *W. A. Barrett*.—On the Relationship of the Magnetic Metals.

No. 309. *Professor Challis*.—A Theory of the Source of Terrestrial Magnetism. *R. S. Brough*.—On Wheatstone's Bridge.

No. 310. *Lord Rayleigh*.—On the Manufacture and Theory of Diffraction-gratings. *O. Heaviside*.—On Wheatstone's Bridge.

The Annals and Magazine of Natural History, Vol. XII, No. 72, Vol. XIII, Nos. 73, 74.

No. 72. *Arthur, Viscount Walden*.—Description of three new Species of Asiatic Birds.

No. 73. *Dr. J. E. Gray*.—Notes on the Smaller Spotted Cats of Asia and its Islands.

No. 74. *Arthur Viscount Walden*.—Description of two new Species of Birds. *Dr. A. Günther*.—Third notice of a Collection of Fishes made by Mr. Swinhoe in China. *Major H. H. Godwin-Austen*.—Description of a new *Sibia* from the Naga Hills. *Dr. H. Karsten*.—On the Theory of the Process of Fermentation. *M. A. Milne-Edwards*.—Observations on the existence of certain Relations between the Mode of Coloration of Birds and their Geographical Distribution. *Dr. J. E. Gray*.—On the Steppe Cat of Bokhara (*Chaus caudatus*).

The Edinburgh Review, Jany., 1874.

The Westminster Review, Jany., 1874.

The Quarterly Review, Jany., 1874.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JUNE, 1874.

The monthly general meeting of the Society was held on Wednesday, the 3rd instant, at 9 P. M.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From Colonel Mowbray Thomson, a Burmese map of the Manipur and Kubbo Valleys, printed on cloth.

2. From E. T. Atkinson, Esq., a set of photographs of the remains existing at Garhwa near Sheorájpúr in the Allahabad district.

The following memorandum accompanied the donation—

The photographs sent herewith represent the sculptures recently discovered at Garhwa near Sheorájpúr in Parganah Bárah of Allahabad. The greater portion were, until recently, covered over with clay and the debris of the temple shown in plate 1. This temple is situated within a fort of which an exterior view is given in plate 18. The site is a depression amongst the low scattered spurs of the Kaimúr hills, which here approach the Jumna, and until a few years ago was surrounded by a thick belt of jungle. On the north and west of the fort there are fine tanks and on the brink of the former, the remains of a ghát of cut stone and in the neighbouring jungles cut stones which appear to have formed parts of some building. The fort itself is of an irregular four-sided form built on a raised platform to which access is obtained by a small doorway and on the west by a small postern gate. Within is an inner fort having only one entrance and originally wall-
ed off from the outer enclosure. Some of the pillars forming the inner square of this enclosure are still standing and show a cell-like arrangement resembling a modern Sarái. They are of various devices from plain voluted shafts

to those elaborately carved all over in panels, shown in plate 2. Others resemble the Buddhist railings found at Gya and other places in Bengal. The capitals shown in the same plate and in the view of the colonnade in plate 12, are ornamented with four-armed figures or animals such as an alligator, elephant, or tortoise. The figures of the avatārs of Vishnu shown in plates 4, 13 and 14 were first discovered by Mr. G. Knox, C. S. and are in wonderful preservation. The most interesting, however, is "the bearded Bhar figure" shown in plate 9. This is universally called a Bhar figure, and is in all respects the same as those figured by Sherring in his 'Castes of Benares' except that it has three heads and also wears the *janav* or sacred thread. It would appear to me to represent some Hindu deity, and not to be necessarily connected with the Bhars. They undoubtedly inhabited this neighbourhood in early times, and it is to this fact must be attributed the assignment to them of all buildings of which the history has been lost. The inscriptions on the pillars of the temple mention a Kayastha family as the persons who dedicated a statue of Narāyana in 1199 Samvat (1142 A. D.), but beyond this we know little of the history of the place. There is no local tradition current respecting it, and all I can suggest is, that it must have been one of the forts in the country of Malaki wa Dulaki destroyed by Ulugh Khān in 1248 A. D. The tract ruled over by this prince lay between Kana and Kalinjar, and Garhwa would lie on the easiest road between those places (Dowson's Elliot, II., p. 348). The mutilation of the figures shows that the destruction of the fort and the overthrow of the statues was due to Musalmāns. Since then it has fallen into several hands and been temporarily repaired in places. The position of the hands in the seated figures in the centre of the group in plate 6 and the form of the head-dress of the figure, of which a back view is given in the same plate, and a front view in plate 9, would point to a much earlier date than the twelfth century, to which all the colossal figures must belong.

Since writing the above, I have seen General Cunningham's account of the fort and its sculptures in vol. III., p. 53 of the Archaeological Reports. He is in error in supposing that Rajah Siva Prasāda was the first to discover these remains. Garhwa has always been a favourite encamping ground of district officers, and as early as 1863, I myself copied the inscriptions. The greater number of the colossal figures now photographed were for the first time brought to light in 1873. It is intended to have them brought in and deposited in the Allahabad Museum.

E. T. ATKINSON.

Naini Tāl, 21st May, 1874.

3. From the author, a copy of Report of the Electrical Superintendent, Government Telegraph Department, for 1872-73, by L. Schwendler, Esq.

4. From Sayyid Karámat 'Alí, a copy of Kitáb u uqul ilalsanah wal-lughát, and a little MS. containing two short treatises in Persian on the Lawfulness of Food, and on Muharram ceremonies.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected ordinary members—

Sayyid Amir Ali, Esq., Barrister at Law, Calcutta.

V. A. C. Smith, Esq., C. S., Azimghur.

The following are candidates for ballot at the next meeting—

D. M. Gardner, Esq., C. S. (for re-election), proposed by Mr. A. C. Lyall, seconded by Captain J. Waterhouse.

Dr. J. Scully, Medical Officer, Kashgar Political Agency, proposed by Dr. V. Richards, seconded by Mr. J. Wood-Mason.

Captain S. H. Cowan, B. S. C., Revenue Survey Department, proposed by Captain J. Waterhouse, seconded by Mr. J. Wood-Mason.

Captain T. B. Michell, B. S. C., Assistant Commissioner, Gowhatty, proposed by Captain J. Butler, seconded by Mr. J. Wood-Mason.

Dr. George Watt, Hughli College, proposed by Mr. J. Wood-Mason, seconded by Captain J. Waterhouse.

W. G. Molesworth, Esq., C. E., proposed by Mr. E. Gay, seconded by Mr. J. Wood-Mason.

Captain T. Deane, Adjutant Viceroy's Body-Guard, proposed by Colonel Hyde, seconded by Captain Waterhouse.

Colonel H. Drummond, R. E., proposed by Colonel Hyde, seconded by Mr. Schwendler.

Major H. A. Mallock, Government Telegraph Department, proposed by Colonel Hyde, seconded by Mr. Schwendler.

The President reported that the Council recommended that the Rev. Fr. E. Lafont, Colonel D. G. Robinson and Messrs. J. O'Kinealy and V. Ball be elected members of the Physical Science Committee.

The Secretary read the following extract from Mr. Burnell's pamphlet on the best way of making and utilizing copies of Indian Inscriptions, forwarded for the information of the Society by the Government of Madras.

"The first question is, how to make the copies? Many ways have been tried: rubbings by heelball on paper, impressions on linen made by a pad daubed with printing ink, sketch drawings, photographs, etc., etc. Considerable experience* and a number of experiments have convinced me that

* Cf. Also the remarks of Prinsep and Mill, and recently of Dr. Bhau Daji, as to the great alterations in the translations required by improved transcripts of inscriptions long known and published. The great objection to photography as a means of reproducing inscriptions consists in the imperfections of the paper used and the difficulty (or impossibility) of managing the light.

all these methods are defective, and that only two ways are really trustworthy—one applicable to inscriptions on stone, and the other to those on metal.

2. "Firstly, for inscriptions on stone, I recommend impressions on stout, unsized paper, such as is now manufactured at Paris for the use of Egyptologists. The inscription must, first of all, be quite cleared of dust, mud, or other obstructions, and this may be best done by a hard clothes-brush. The paper is then to be rapidly but uniformly wetted in a tub of water, and applied to the inscription, and forced into the irregularities by repeated and forcible strokes with a hard brush; an ordinary clothes-brush is as good as any for the purpose. If the stone be clear of dust, the paper adheres, and when dry falls off, forming (if at all well done) a perfect mould of the inscription. Paper large enough to cover most inscriptions is easily to be had; in the case of very large ones, it is necessary to lap over the edges of the sheets, and apply a little gum and water or weak paste to them; and also to prevent those sheets first applied from falling and thus spoiling the rest, a few poles or sticks leaning against the corners in large inscriptions, or the gum used for joining will be found enough. When properly dried, copies made in this way (in French, "*estampages*") may be rolled up or put in blank books without the slightest injury, and even will stand damp. M. Mariette-Bey and Dr. Brugsch both assured me in Egypt last year that they never found this plan fail.

3. "The second process is applicable to inscriptions on plates of metal; I devised it several years ago, and never found it fail. The plate or plates should be carefully cleaned with a dry brush, and the letters occasionally must be cleared out with a blunt graver. The native process of rubbing the plates with acid and then putting them in the fire to loosen the encrustations should never be resorted to, as it invariably injures them fatally. From the cleaned plate an impression (reverse) is to be next taken by passing a roller charged with ink over the plate, and then printing from it as from an ordinary copper plate. From this impression another may be taken by means of an ordinary copper-plate press; and, with a little practice, a perfect facsimile may be thus obtained, the letters being white and the rest of the plate appearing a dark grey. Photozincography and many other methods exist by which '*estampages*' and facsimiles made by the last process may be multiplied to any extent."

Also a letter from the Secretary to the Government of India, Revenue Department, forwarding copies of the following circular of Her Majesty's Commissioners for the London International Exhibition of 1874, and enquiring whether the Society could render any assistance in furtherance of the objects in view.

LONDON INTERNATIONAL EXHIBITION, 1874.

The Ethnology and Geography of the British Empire.

1. Her Majesty's Commissioners have resolved to commence, in connection with the series of International Exhibitions, Permanent Collections which shall illustrate the Ethnology and Geography of the different portions of the British Dominions, and ultimately form a great National Museum of the Empire upon which the sun never sets. They will be arranged for the present in the Galleries of the Royal Albert Hall. Many portions of the Empire are inhabited by Aboriginal Races, most of which are undergoing rapid changes, and some of which are disappearing altogether. These races are fast losing their primitive characteristics and distinguishing traits.

2. The Collections would embrace Life-size and other Figures representing the Aboriginal Inhabitants in their Ordinary and Gala Costumes; Models of their Dwellings; Samples of their Domestic Utensils; Idols; Weapons of War; Boats and Canoes; Agricultural, Musical, and Manufacturing Instruments and Implements; Samples of their Industries, and in general all objects tending to show their present Ethnological position and state of civilisation.

3. It is proposed to receive for the Exhibition of 1874 any suitable Collections, which will be grouped and classified hereafter in their strict Ethnological and Geographical relations. As, however, there is at present great public interest in the various Tribes inhabiting the West Coast of Africa, including the Ashantees, with whom this country is at war, all objects relating to the Ashantees, Fantees, Dahomeys, Houssas and the neighbouring Tribes are especially desired. The Indian Empire, the Eastern Archipelago, and the Islands of the Southern Hemisphere are also able to afford abundant and valuable materials for the proposed Museum, of which it is believed that the nucleus can be formed at once from materials in private Collections.

4. Her Majesty's Commissioners confidently appeal to the Civil, Military, and Naval Officers of the British Service throughout the Queen's Dominions to assist them in these Collections.

5. Her Majesty's Commissioners have secured the services of eminent gentlemen to advise them from time to time in giving effect to these intentions.

It is requested that offers of Gifts and Loans of Objects should be made known at once to the Secretary of Her Majesty's Commissioners, Upper Kensington Gore, London, S. W.

The following papers were read :

1. *On the Portuguese Settlements in India.* By T. W. H. Tolbort, Esq., C. S.

(*Extracts.*)

The object of the following paper is to describe the present appearance of the Portuguese Settlements in India. Points of historical interest will be chiefly considered ; social and political features will not be dwelt upon.

The existing Portuguese Settlements are Daman, Diú and Goá. We take Daman first, as the easiest of access from Bombay. The territory of Daman is intermixed with British territory and with that of Dharmapúr. This intermixture is due to political events of the 18th century. The neighbouring stations south of Daman were wrested from the Portuguese by the Maráthás about the middle of that century, and from them passed at the downfall of Maráthá power into our possession. On the other hand, in 1780, the territory of Daman was augmented by the detached parganah of Nagar [Haweli] Avelly which the Court of Púná ceded in indemnification for some piratical act against a Portuguese ship. The population of the Daman territory is about 45,000, of whom 1500 are Christians.

A ride of five or six miles from the Daman Road Station on the Bombay and Baroda Railway takes the traveller to the port of Daman itself. The port of Daman is formed by the estuary of a small river generally known as the Daman Ganga, though I believe it also bears the name of Sandalkal. The environs of Daman on the land side are not very cleanly ; the number of pigs roaming at will, and devouring the garbage in their way, indicates the presence of a Portuguese population.

There are two forts at Daman, one on each side of the estuary, each having a small town in its vicinity. The larger fort and town are on the south or Bombay side ; the smaller and more recent on the north or Súrat side. The visitor from the railway arrives on the north side, but as the southern fort is in every respect the more important of the two, we give it precedence in our description. Its shape, though irregular, approaches that of a square, through the middle of which, north and south, runs the main street from the "Porta do Mar" to the "Porta da Terra." The wall is substantially built of stone. The principal bastion, the "Baluarte da Barra," is at the north-west angle, commanding the entrance to the harbour. Below it is a small supplementary outwork constructed, I believe, in 1830. The remaining bastions are San Phelipe, San Domingo, Santiago, San Jorge, Sant Ignacio, San Sebastian (porta da terra), San Martinho, San Miguel, San Francisco, Madre de Deos, back to the "porta do mar" again. A description of Daman, dated 1634, published as an extract in the third volume of the "Chronista de Tissuary" gives a list of the bastions nearly identical with the above. From the description generally we may conclude

that the outline of the two forts at the present day is quite or very nearly the same as it was more than two hundred years ago.

Entering by the *Porta do Mar*, the visitor has on his left the ruins of the ancient church of the monastery of the Franciscans, distinguished by its tall tower and by its numerous tomb stones, half buried in the *débris*, half hidden by grass and weeds. Beyond this, still keeping to the left or east of the central road, is the ancient church of the Augustine Friars, now used as the barracks. Further on, near the *Porta da Terra*, is the old monastery of the Order of St. John of God, a lay fraternity who devoted themselves to the care of the sick. The building retains the character of a hospital as in earlier days. Opposite this, on the other, *viz.* the western side of the central road, are the Town Hall, the Jail, and the modern Church with its attendant chapel to the Virgin. Returning on the western side, the visitor passes the ruins of the Dominican church and convent, and then those of the Jesuit establishment, the Church of St. Paul, and the Santa Casa de Misericordia. Of the Jesuit buildings mere traces are left, as their suppression took place at an earlier date than that of the other religious orders.

In front of these ruins, facing the central road, are the Governor's Palace and buildings appertaining to it. These of course are kept in good repair and have undergone modifications suited to modern requirements. The site, however, is the same as in 1634; but we find from Bocarro that at that date the Governor's house, with the church and college of the Jesuits and some other buildings, formed a fortress within the city, surrounded by a brick wall, and that this fortress and wall had been built by the Muhammdans before the Portuguese conquest.

Daman had twenty-seven cannon in 1634, and many, if not most of these, are still on its ramparts, though the *Baluarte da Barra* is the only bastion now garrisoned.

On the land side the fort is protected by a ditch, cut from the sea to a small rivulet or *nálah* flowing into the Daman Ganga. This *nálah*, which is almost dry during the greater part of the year, is crossed by a drawbridge. Beyond the ditch is a *maidán*, leading to the larger of the two native towns of Daman. On it stand a few modern houses, belonging to Portuguese residents, and a deserted chapel, opposite which is a cross. I was told that the besiegers of Daman once came as far as this cross. Probably this tradition refers to the Maráthá attacks in the eighteenth century, though it may have been handed down from the earlier siege by Aurangzib. For an account of the latter see Tavernier, vol. 2, page 124.

We now turn back to the small fort on the north side of the harbour, all the localities hitherto described being on the south side. The small fort is dedicated to St. Jerome. Its wall is somewhat higher than that

of the large fort. In shape it is an irregular quadrilateral, but there are only three bastions, bearing the names of St. Francis Xavier, St. Ignatius, and St. Jerome himself. Bocarro writes of a bastion Santiago, but apparently this is the one now called after St. Ignatius. Immediately over the gateway is a statue of St. Jerome, and on the sides are figures of two giants in bas-relief, looking like Gog and Magog, each with a motto or couplet. There is a church in the small fort for the convenience of the Christians on that side of the harbour. Some old cannon are still on the bastions. I noticed one with an inscription of the time of "Don João Cotigno, Conde do Redondo, Viceroy, 1618." Sr Rivara refers to one of great antiquity, called the St. Catherine, with the following inscription in Latin, "Joanes Vte (Vicente) faciebat, gubernate Nuno da Cunha, anno 1537."

Below the walls of the small fort, outside, are several good wells. Beyond, is the town, Portuguese and native, of Little Damán.

There are numerous inscriptions in Damán of greater or less antiquity. Eighty-seven of these have been collected by Sr. Rivara in the second volume of the *Tissuary*. Omitting those of minor interest, for the most part on tombstones, we give a few of the more important.

Over the *Porta do Mar* is the following:

"Na era de 1593 sendo capitão desta cidade Do Duarte Deça, que foi ho deradeiro que El-Rei Dom Sebastião com ela despachou, foi por ele lançada a primeira pedra neste beluarte S. Francisco, e se fez esta porta."

Over the Palace, or Government House, is the following:

"Conquistada por Martin Affonso em 1528 a 1538." Capitão Mor de Mar. Ind. &c. Reconquistada em 2 de fevereiro de 1559 pelo. Vice-Rei da India Dom Constantino de Bragança.

This inscription is modern, but occupies the place of an older Latin one. Over the *Porta da Terra* is the following:

"Na era de 1581 sêdo Martin Affonso de Melo capitão desta cidade foi por el defêdida aos capitais do Grã Mogor que a tiverão de serquo, he se fez na fortificação della parte deste Baluarte Sao Sebastião he se fes 4 quartinas de muro cò dons baluartes de madeira, S. D^o. he S. Mart. he se fes esta porta."

On the front of the small fort are two inscriptions, that to the right commemorating the commencement of the fort.

"Este Forte Sao Jeronimo se começou por ordem de Dom Jeronimo de Azevedo sendo Viso-Rei da India no anno de 1614, e os Administradores da fortificação desta cidade lhe mandarão lavrar esta pedra por agradecimento com suas armas abertas e emalhadas pera perpetua memória dos seculos vindouros." And that to the left its completion—

"Este Forte se acabou em tempo de D. Francisco da Gama Conde Al-

mirante sendo a segunda vez Viso-Rei da India no anno de 1627, e os Administradores da fortificação em reconhecimento ao dito Viso-Rei em cujo viso-reinado se fez a mor parte deste Forte, pera defensão do qual mandou de Goa 4 pesas grandes de artilharia, ordenarão que nesta frontaria se entalhassem as suas armas pera eterna memoria." Besides these there are the mottoes of the two giants; on the left—

Quem por aqui quizer entrar com esta mo ade pagar; and on the right—
Que en he men companheiro a vigiamos sem dinheiro.

The numerous epitaphs range from the year 1564 down to modern times.

Leaving Daman we pass to Diú, the most interesting of all the Portuguese settlements after Goá, but the one least known to Englishmen, as it lies so out of the way. The passage from Daman to Diú in a sailing vessel takes on an average three or four days.

The island of Diú lies to the south of Káthiwár. Its length from east to west is about seven miles; its average width from north to south scarcely a mile. It is separated from the mainland by a narrow arm of the sea, the eastern access to which is easy for ships of considerable burden, while the western access is obstructed by shallows. A portion of the Portuguese territory, including the village of Gogola, lies on the north of the inlet, adjoining the mainland.

The fortress or citadel of Diú, a formidable and imposing structure, is at the extreme east, or north-east point of the island. To the west of this is the town or Praça, including both the European and native quarter, and covering a considerable space of ground. This is also fortified, especially by a long wall yet further to the west, which runs right across the island. The remaining four-fifths of the island beyond this wall consist of a low sandy strip on the north and of porous rock on the south, between the ridges of which are several small plots of fertile soil where Persian wheels are worked and crops are grown, and in some of which palm trees are numerous. Generally, however, the vegetation, though not destitute of verdure, is limited to grass, solanaceous plants, and different species of euphorbias.

A few small hamlets and some detached forts are scattered through the island, but Diú and its suburb Gogola are the only places of any importance.

The fortifications are constructed of stone dug in the island, and the Praça is intersected by the numerous quarries thus excavated. The stone somewhat resembles the laterite of the Malabar coast, but is darker in colour and much stronger in substance.

Three great events have made Diú memorable in the history of Portuguese India; (1), the death of king Bahádur of Cambay followed by the first siege of Diú in 1537-38. (The Portuguese had built the fortress in 1535.) (2), The second siege of Diú in 1516; (3), The sacking of Diú by Arabs from Maskat in 1668. The two former are among the most glorious inci-

dents of Portuguese history, and may be compared, say to the defence of Arkát or to that of Lak'hnaú in the history of British India. The third event was a sad contrast to the two former and with other contemporary disasters marked the decadence of Portuguese power.

Gaspar Correa, who wrote his History about 1561, has preserved a sketch of the fortress of Diú as it was in his days. There have of course been numerous alterations of detail since then, but essentially the appearance of the fortress is much the same.

From the inscriptions it would seem that the bastions of the outer line received their present names and form between 1630 and 1642, but the plan dates from the time of Don João de Castro who, after the second siege, constructed a new line outside the old, to avoid the trouble and delay of clearing away the débris of the bombardment.

Crossing the outer ditch by a permanent bridge and the inner one by a drawbridge, the visitor proceeds for some distance along a causeway; then, turning to the right, he passes through a double gateway into the fortress. Over the gateway is a Latin inscription, commemorating the vow of King John IV, who in his Cortes of 1646 dedicated his kingdom to the Virgin Mary, and swore to maintain the doctrine of her immaculate conception.

There is a similar inscription at the entrance of most Portuguese towns, and one to the same effect, in Portuguese, may be seen in the Museum of the Bombay Asiatic Society.

The gateway and the landing pier are protected on the harbour side by a bastion, called indifferently after St. George and St. Martin. This is one of the oldest in the fortress. It is shown in Correa's sketch, and perhaps existed in some form or other in the fortress as originally constructed by Nuno d' Acunha. It contains two or three very old cannon, one of them with the following inscription: *Nonii da Cunha Presidis jussu conflatum et absolutum an, M. D. xxxiii, Reimon me fecit*. This gun is called the Tiger, and bears a figure and a second inscription in accordance with its name.

The name of St. George seems to have been given to this bastion between the first and the second siege of Diú, for I find no mention of it in the accounts of the first siege, and it bears the following inscription as a testimony to its date. *Este baluarte fez Manoel de Souza de Sepulveda Capitão desta fortaleza, e alargou toda a cava de mar a mar ma is houtro tanto do que estava na Era de 1542 governando a India Martim Afonso de Souza.*

This bastion is mentioned in the accounts of the second siege (1546), Correa speaks of it as the 'bastion of the gateway,' while Freire de Andrada gives it the name of St. George. The name of St. Martin was given afterwards to commemorate the victory gained by D. João de Castro on St. Martin's day, when he marched out of the fortress and put an end to the siege. There is an inscription referring to this victory over the guard-room

near the gateway. Esta casa se fez em louvor de nosso Sôr e do Bema-
vêturado Samart^o. porque em-se v dia deshara tou o Gôr Dô Jo
de Crastro todo o poder de
I-Rei de Câbaia q' tinha cere
ada esta fortaleza e no mes mo dia per força darmas lho tomou a sua
nobre cidade e il lha de Dio 1546.

In the centre are the arms of Castro.

Entering the body of the fortress, we find ourselves in a small square with the ruins of a church on the left, the old palace or Government-House and the Prison on the right, and some other Government offices in front.

I believe the church is that of the Misericordia, which appears to have served as the hospital. This was the church in which the Portuguese heard mass and confessed, before marching out to attack the Muhammadans.

All these buildings bear numerous inscriptions, two on the palace, dated 1612 and 1647; two on the ruined church, dated 1542 and 1765; one on the prison, dated 1604; and one in Latin dated 1702 over the gateway, on the inner side.

Turning to the right and passing the palace, we reach the double line of bastions facing the city. Those in the outer line are named respectively after St. Domingo, St. Nicholas, and St. Philip; those in the inner line are called the Round Bastion, Menagem, Cavalleiro, and Santiago. Of these, Santiago is the only name that has come down from the second siege. It is at the end of the ditch towards the open sea. This, then called the Tower of Santiago, was one of the points of attack during the second siege. Below it is a chapel named after the same saint. The chapel has been rebuilt several times, but it occupies the same site as during the siege and appears to be of the same size and form as then. The English turned it into a godown during their occupation of Diú at the beginning of the present century. The Baluarte Cavalleiro is, as its name implies, the highest of the bastions, that on which the flag is hoisted. The present bastion bears date 1636. During the siege, this site was occupied by the bastion of St. Thomas, which was frequently assaulted and for some time held by the enemy. The bastion of St. John, if I understand the narratives aright, must have been somewhere between Cavalleiro and Menagem. It was blown up during the siege by a mine, which caused the death of sixty of the defenders, among whom was Fernando de Castro, one of the sons of the Viceroy.

Menagem appears to occupy the place of the "Torre do lugar da porta," and the round bastion facing the harbour, that of the Baluarte Santiago. This Baluarte Santiago must not be confounded with the tower of Santiago, which we have already described as near the chapel of the same name at the other extremity of the ditch towards the open sea. The above

identification of modern and ancient bastions seems to me justified by the histories of the siege, but it may be open to correction, in some of its details. There are several inscriptions on the different bastions, but some of them seem misplaced. Several are of great antiquity; one of 1545, before the second siege, another commemorating the reconstruction of the fortress by D. João de Castro in 1547, and a third commemorating the restoration of Portuguese independence in 1641. This last is on the bastion of St. Domingos.

Leaving the city side of the fortress at the chapel of Santiago, we pass along the wall facing the open sea. It was here that some of the besiegers entered by stealth while the attention of the besieged was called off by an assault on the bastion of St. Thomas. Beyond this are the ruins of the Cathedral, Correa's sketch represents it with two towers and spires. The next object of interest is the bastion of St. Theresa, with an inscription to the effect that it was constructed in 1652. Below, and in front of this, is the bastion of S. Luzia with the *Courça grande* or breastwork beyond it forming the extreme point of the fortress on the east. The bastion of S. Luzia was built in 1650. Near this bastion is another very old cannon, dated 1537 in the time of Nuno da Cunha.

Between S. Luzia and St. George (the bastion with which we started), are the cisterns of the King and Queen, so contrived as to collect all the rain water from the roofs and walls of buildings in the fort. This is important as there are no wells nearer than the city.

We have thus completed the circuit of the fortress, but a few words must be added as to the Forte do Mar. This is a small detached fort, built on a rock in the centre of the harbour, the entry to which it commands. This fort dates from the earliest period of Portuguese occupation. During the first siege of Diú in 1538, when the enemy had a fleet as well as an army at their command, the Forte do Mar was vigorously, but unsuccessfully, attacked, the defence being aided, according to Correa, by the miraculous interposition of St. James. The oldest existing inscription in this little fort is the following;

Sends Aires Falcão capitão desta Fortaleza de Dio mandon acre secentar este baluarte do mar da maneira que esta na era de 1588.

There is another inscription commemorating an alleged victory by Antonis Teles over the Dutch fleet in January, 1638.

On the ground in front of the fortress are some interesting monuments without inscriptions; a tall obelisk, said to mark the spot where Khwájah Zafar was killed during the second siege; a smaller obelisk said to mark where Rúmi Khán, the son and successor of Khwájah Zafar, experienced the same fate, and a cross said to mark the burial place of D. Fernando de Castro. Tradition can scarcely be trusted as to the exact signification of these monu-

ments, but in all probability they do commemorate incidents of the second siege. It appears that the ground in front of the fortress, and also the interior of the fortress itself were formerly encumbered with numerous buildings which were cleared away about the beginning of the 17th century.

At present, the houses of the Portuguese residents, the principal churches and other buildings of European construction are four or five hundred yards from the fortress, between it and the native quarter of the city. The chief churches are those of St. Paul, St. Francis and St. Domingos. That of St. Paul—apparently the Jesuit establishment,—was founded in 1601. The churches contain numerous epitaphs of deceased Governors, the oldest being that of Luis Falcao who was killed by a musket shot in 1548. This, however, was originally placed in the Church of the Misericordia, within the fort.

Beyond the European quarter is the native town of Díu.

Then comes the great wall, which runs across the island from sea to sea, dividing the town and fortress from the rest of the island. The wall of the fortress runs from sea to sea in the same way, but its length is not more than four or five hundred yards. That of the city wall must be nearly a mile. There is a handsome gateway in the centre, the *Porta do Campo*. Over this is an image of St. Ignatius. The city wall was begun by Aires Teles in 1570. It has numerous bastions and bears many inscriptions, several between 1570 and the end of the 16th century, but more of a later period, the beginning of the 18th century.

Beyond the wall, though within a mile of the city, are two prominent but deserted churches, that of *Nossa Senhora de Remedios*, and that of *Nossa Senhora de Guia*.

Bidding farewell to Díu, we proceed to describe Goá itself, the famed capital of Portuguese India. The best guide to Goá is that written by the Rev. Denis L. Cottineau de Kloguen and dedicated by him to Sir John Malcolm. It was published at Madras in 1831, and a Portuguese translation has been since published at Goá, but copies of the work are now rare whether in English or in Portuguese. Captain Burton devoted some pages of one of his earliest works "*Goa and the Blue Mountains*" to an account of Goá, but this account is somewhat flippant, and gives very little antiquarian information.

The changes since Cottineau's time are not so great as might have been expected. The buildings in Old Goá are mostly of laterite and the damage caused by each year's monsoon must be considerable, still many of the ruins are well preserved.

Three miles up the Goá river is the church of the *Reis Magos*. Beyond this is New Goá, or Panjim, which was an important suburb even in ancient

days, and which supplanted Goá as the capital in 1765. One of its churches, I believe that of N. S. da Conceição, stands on an elevation overlooking the town. It appears to have been built in the beginning of the 17th century, as it contains inscriptions as early as 1654. In the principal square is a statue of Albuquerque. This statue, now black with age, was removed to Panjim from Old Goá in the year 1810. In Pyrard's time (1609), it stood in front of the Church da Serra near that of da Misericórdia. The figure is that of a man rather below middle height, with a long beard, his elbows stretched out, and his hands resting in front.

Two very pleasant excursions may be made from Panjim, besides the visit to ruined Goá. One of these is westward to Cabo, the extreme point of the island, which commands the same view as Aguada, though from a different point. The building at Cabo was formerly a Franciscan monastery. It was founded in 1594, and contains several inscriptions of the 17th century. There are also paintings, one representing the death of a Princess of Portugal, and several pictures of saints.

The other excursion is across Goá Island, in a south-westerly direction to Goá Velha. Goá Velha must not be confounded with the ruins of the Portuguese city, known to us as Old Goá. It is the site of a yet more ancient city occupied by Hindús and Muhammadans in times long prior to Portuguese conquest. Near Goá Velha is another interesting convent, that of N. S. de Pilar. This also belonged originally to the Franciscans, but was afterwards made over to the Carmelites. A Carmelite prior, the solitary survivor of his society, still officiates at this church.

The distance from Panjim to Goa itself is about six miles. The road crosses a bridge built by the Count de Linhares in 1634, and then traverses a causeway, about four miles long, having the shore of the estuary or Rio de Goá on the left and an expanse of marshy meadow land on the right. The causeway was built in 1771. At the end of this causeway is the village or suburb of Ribandar, then that of Pannely and then Goá. Goá, however, provided wind and tide are favourable, is more easily and pleasantly reached from Panjim by water. Supposing the latter course to be adopted, the visitor will probably leave his boat in front of the principal gateway. A road leads from the landing-place through a luxuriant grove of cocoanuts to this gateway, all that remains standing of the Viceroy's palace, founded in the first instance by Albuquerque himself. Over the gateway is a statue of Vasco da Gama, erected by his grandson in 1600. Within the gateway is an inscription, commemorating the enfranchisement of Portugal, and the usual inscription of John IV., dedicating the place to the Virgin, 1646.

On the left of the gateway are the Church and Convent of St. Caetan. This is one of the few churches still kept in good repair. It is a domed

building, more in Italian than Portuguese style. It was built in the middle of the 17th century by the order of the Theatins.

Behind this Church, in low ground, are the ruins of the Dominican Church and Monastery; and very near these, to the south, but on an elevation, are the ruined Church and Monastery of the Carmelites.

The Church and College of St. Paul (the Jesuit establishment) are shown in Cottineau's plan just to the south of the Carmelite Convent, but they were in ruins in his time, and now almost all traces of them seem to have disappeared.

The hospital of St. Lazarus where, says Cottineau, St. Francis Xavier generally passed the night, in order that he might help and serve the sick, was to the east of the Church of St. Paul.

Behind, that is, to the east of the Dominicans and Carmelites is the Church of N. S. dal Monte, a prominent building standing on a hill.

Turning to the other side, westward from the main gateway, we come to the Cathedral, dedicated to St. Catharine, on whose day Goá was taken by Albuquerque. It was founded as the first parochial church soon after the conquest, and it became a Cathedral in 1534. According to Cottineau, it was enlarged and rebuilt in its present state in 1630. It is crowded with epitaphs, mostly of the beginning of the 17th century. Many of these have historical interest. I noticed one to the memory of Gasper de Leão, first archbishop of Goá, who died in 1578. This was removed to the Cathedral in 1864 from one of the other churches.

In front of the Cathedral, a little to the south, is the site of the Inquisition. Behind the Cathedral and almost contiguous with it are the Monastery and Church of the Franciscans.

Leaving this group of buildings and passing the ruined churches of Misericórdia, we reach what was formerly the heart of the city. A few hovels are all that now remains of the bazar.

Near these is the Church of the Bom Jesus, with a spacious house adjoining it. From inscriptions in the church itself, it appears to have been founded for the Jesuits by Mascarenhas, Captain of Cochin and Ormus, who died in 1593. It was consecrated by Archbishop Menezes in 1605, and the body of St. Francis Xavier, which had been originally deposited in the Church of St. Paul, was removed in 1624 to this church, where it still remains, transferred in 1655 from one side of the church to the other.

Over the main altar is a statue of St. Ignatius. There is another statue at the side, in silver, of Xavier himself. At the entrance of the church on the left, exposed in a glass case, is the embalmed body of Saint Paulina, with whose history I am not acquainted. Opposite the chapel in which Xavier's body now lies, in the chapel of St. Francis of Borja, and it was here that Xavier's body was first deposited in 1624.

The chapel at present occupied by the tomb is at one extremity of the transept. The mausoleum itself was presented by a Grand-Duke of Tuscany. It may be said to consist of three stages besides the silver coffin on the top. The lowest stage is of jasper, ornamented with figures of cherubs of Carrara alabaster. The second stage is also of jasper, of various colours, each of the four sides containing a bronze bas-relief, representing a scene in Xavier's life. That on the west, *i. e.*, at the feet of the corpse, represents the saint baptising savages; above it is the motto "*ut vitam habeant.*" The second bronze, on the side of the Church, represents Xavier preaching, and is surmounted by the motto "*Nox inimica fugat.*" The third bronze, on the opposite side to this, represents Xavier fleeing from the savages of the Island of Moro and bears the motto "*Nihil horum vereor.*" The fourth scene at the head of the coffin is that of Xavier's death, and over it are the words "*Major in occasu.*"

Above this is the third stage, built of jasper and other stones of various colours. On this rests the ornamented silver coffin with a cross beneath a rich crimson canopy surmounted by a coronet. The last time that the coffin was opened and the body exhibited, was in 1859. The exposition previous to this was in 1782.

Going westward from the Church of the Bom Jesus we come to another group of buildings, comprising the Nunnery of St. Monica, the Convent and Church of St. John of God, the ruins of the Augustinian Church and Convent and those of the Jesuit College of St. Roc. The Nunnery was founded by Archbishop Menezes in the beginning of the 17th century. It is still habitable though out of repair; only one old nun is left.

The storms of the Malabar coast have made sad havoc with the Augustinian Monastery during the past 46 years, for Cottineau, writing about 1827 describes it in admiring language. But this description no longer applies; the buildings are now in ruins, though a portion of the wall and tower is still the most prominent object in Old Goa, and attests by its loftiness the former grandeur of the fabric.

Tavernier refers to a bitter dispute between the Augustinians and the Jesuits, arising from the construction by the latter of a college close to the convent of the Augustinians and much to their inconvenience. This Jesuit building must have been the college of St. Roc, the site of which is near the Augustinian convent though the building was in ruins even in Cottineau's time. Near this, are the churches of St. Anthony and of the Rosary.

We have now reached the western side of old Goá, where it joins the suburb of Pannelly. Returning by the water's side towards the gateway from which we started, we pass in succession the ruins of the Franciscan College of St. Bonaventure, the Arsenal, and the site of the Aljuvar or Archbishop's prison. There are a few old cannon in the Arsenal and two

or three soldiers appear to be kept on duty there. Over a doorway is the inscription—*Nos autem prædicamus Christum crucifixum.*

In the suburb of Pannelly is a building of some architectural pretensions, but apparently of less antiquity than those previously mentioned, which has served as the Archbishop's Palace. It is now going to ruin.

The Library at Goa is worth a visit. It contains a large number of volumes from the ruined and suppressed convents, though probably it does not contain all that they comprised. A great number of the books are in Spanish or Portuguese, and, as may be supposed, theological and monastic works predominate, though the number of other books is by no means small.

To this account of existing Portuguese settlements we may append a few notes regarding Bassein and Cochin, two places renowned in early Portuguese History, though now held by the English. Bassein bears a general resemblance to Damán. As at Damán, one gate faces an estuary or inlet of the sea, while the other faces the land. The wall of the ancient fortress is still well preserved, and the interior contains the venerable ruins of several ancient churches and monasteries.

The ancient jurisdiction of Bassein (or, as the Portuguese spell it, Baçaim) extended as far as Chául, including Agaçaim, Manora, Asserim, Tana, Bombay, Caranja and Elephanta.

The bastions of the Bassein fortress are thus enumerated by Bocarro (A. D. 1634), Cavalleiro, N. Sa. dos Remedios, Reis Magos, Santiago, Sam Gonçalves, Madre de Deos, Sam João, Elefante, Sam Pedro, Sam Paulo and Sam Sebastião. The number of guns is said to have been eighteen. Four convents are enumerated, *viz.*, those of the Dominicans, the Franciscans, the Augustinians, and the Jesuits. There were two churches within the walls, —the Cathedral and the Misericórdia,—and there were numerous churches in the suburbs.

The author of the *Chronista de Tissuary* visited Bassein fifteen years ago and says—"Almost the whole of the Portuguese wall there is preserved, and in the circuit of the ancient city there still remain several buildings more or less ruined. The gate on the sea side stands perfect with all its nails and ironwork, but there is a modern temple close to the entrance of this gate. In the street which leads from it, on the left, are the ruins of a church, on a stone over the door of which the following inscription is to be seen. "No anno de 1601 sendo Arcebispo Primaz o Illm^o. Sr. D. Frei Aleixo de Gusmão e Vigário o P^o. Pedro Galvão Pereira se reformon esta Matriz." Further on, at the end of the street which runs along the wall, is a porch which appears to have been the gate of the castle or citadel; on the right is a fallen pillar with the inscription—"Governando o Estado da Índia o Rei Dom Miguel de Noronha, Conde de Linhares se fez este pedestal para se poz por padroeiro desta cidade a Sam Francisco Xavier. 1631."

Above, on the facing of the portal, and on the right of the spectator, is the following—"Sendo Capitão desta cidade Gaspar de Mello de Miranda e veadores Gonçalo Coelho da Silva, Pero Ferreira, e João Boto Machado cô os mais officiaes se poz neste (portal?) a Sam Xavier que tomarão por sen patrono.....No anno de 1631."

In the enclosure of the ancient castle is a steam sugar-refinery, which also occupies the ancient church that used to be there, the name of which I could not discover. In the open space in front is a good temple, and at the end of the open space the convent of St. Dominic, the greater part of which is in ruins. The Church, however, is standing, though without a roof; in its principal chapel there is still the tomb of the patron, on the gospel side of the altar, but it has fallen in and the epitaph is destroyed. The church is very large, might be easily restored, and still retains the arch of the principal chapel.

In front of the Refinery above referred to, there is an ancient chapel which serves as a warehouse. The Church of St. Paul, of the Jesuits, is still standing, without a roof, but with the arch of the principal chapel. In it are the following grave-stones and epitaphs: "Sepultura de Isabel de Aguiar, Donna viuva, insigne bemfeitora deste collegio. Falleceo a 24 de Janeiro anno de 1591."

Sepultura de Doña Filipa da Fonseca, Dona viuva, insigne bemfeitora desta igreja a quem em sua vida den tudo quanto tinha. Faleceo a vinte de julho da era de 628.

The façade of the church is a rich structure with Corinthian columns, built entirely of black stone and well preserved. The greater part of the College is standing with its cloisters, &c. In another street, which runs along the wall, there is a modern English tomb, and opposite it an ancient postern, in the wall, above which is the inscription—"Reinando ho muio alto e muito poderoso Rei Dom Joam de Portugal 3 deste nome e governando a India o Vice Rei Dom Afonso de Noronha filho do Marquez de Villa Real, sendo Francisco de Sá capitão desta fortaleza e cidade de Baçai, fundon este baluarte per nome Sam Sebastiam aos 22 dias do mes de fevereiro era 1554 anos."

There is a large church and convent in ruins, which appears to me to be that of the Franciscans. The principal chapel retains its arch and in the centre of its pavement are the remains of a tomb stone. "..... e do conselho de Sua Magestade Faleceo em 24 dagosto de 1558 e de sua mãe Dona Luiza da Silva e sens erdeiros." In the first chapel on the gospel side of the altar—"Aqui jaz Dona Francisca de Miranda, molher de Mello Pereira, instituidora desta capella, e sua filha Dona Ines de Melo neto Luis de Melo, a qual faleceo a 10 de Novembro de 1606.

In the next Chapel—"S^a de Dona Giomar Daguiar molher de d'Alvaro de Lemos que Deos aja. Faleceo a 4 de março de 90 de seu filho."

The gateway on the land side is uninjured, but without the wooden gates.

At Cochin the chief relics of Portuguese dominion are, the ruined Cathedral tower, and the building now used as the Protestant Church. The Cathedral, after serving the Dutch as a warehouse, was blown up by the English in 1806. The tower which remained standing after the explosion, now serves as a light-house.

The church in present use was originally dedicated to St. Antony, but formed a part of the Franciscan monastery. It has been renovated two or three times, and in the course of these changes most of the tombstones Portuguese and Dutch, with which it is crowded, have been transposed. There are also several tombstones in other parts of the town.

The volume of the *Chronista de Tissuary* from which we have translated the notes regarding Bassein gives a list of Portuguese inscriptions at Cochin, but they are mostly the epitaphs of private individuals. It is, however, worthy of note that the great Vasco da Gama himself was first buried in the Franciscan Church, now used by the English, at Cochin. His body was subsequently removed to Portugal, but there is a tradition that one of the tombstones in the church, which appears to bear the name of Gama, belonged to his original tomb. This, however, may be a mistake, as we do not find the inscription in the list given by the *Chronista de Tissuary*.

2. *On Earth-Currents.* By L. SCHWENDLER, Esq.

(Abstract.)

Mr. Schwendler said that the phenomenon of earth-currents seemed to be intimately connected with the earth-magnetism and its variations.

He would, however, point out from the beginning that though the two phenomena, "*earth-magnetism*" and "*earth-currents*," were undoubtedly connected with each other, it was by no means established as yet that they were cause and effect, or, what certainly seemed to be far more probable in the present state of knowledge on the subject, parallel effects of one and the same general but entirely unknown cause.

The three elements of the earth-magnetism, intensity, inclination and declination, had been quantitatively and most accurately determined in almost all civilized parts of the world (Calcutta excepted) by the introduction of Gauss' and Weber's well known system of magnetic measurements, and though the results obtained had been very general and satisfactory, establishing the most interesting facts of diurnal and secular periods of variation in the three magnetic elements, and had also been of direct practical benefit to navigation, still the physical nature of the phenomena had

not been unveiled by these observations. To solve the problem it would seem that quantitative measurements of other phenomena, directly or indirectly connected with it, were required, and it was most fortunate that at least one such phenomenon not only existed but was even susceptible of accurate measurement: he meant the *earth-currents*.

The chances of giving a true physical explanation of any phenomenon, he observed, increased in geometrical progression with the number of phenomena directly or indirectly connected with the one to be explained, supposing that they were all susceptible of accurate measurement.

In this particular case he had to deal with two such parallel phenomena, the magnetism of the earth, quantitatively ascertained for more than 40 years past, and "*earth-currents*," sadly neglected.

He said he was perfectly aware why "*earth-currents*" had not been measured, and then, after mentioning the special purpose of his paper, *i. e.* not to start a fresh theory of the earth-magnetism with the scanty and imperfect material available, but to lay before the Society some more facts connected with its parallel phenomenon, the earth-currents in the Telegraph lines, which had been quantitatively measured during the last six years in widely different parts of the empire, Ceylon included, he proceeded as follows:

"That it was well known that from time to time Telegraph lines, overland, underground and submarine, were affected by what had been called, 'magnetic storms,' *i. e.* by very strong currents passing through the wires and overpowering entirely those used for signaling, with which electrical disturbances co-existed magnetic variations far exceeding the limits generally observed when no such electrical disturbances exist, and very often accompanied in the northern (and most likely also the southern) part of the planet by vivid auroras. Now these currents observed in the Telegraph lines were '*earth-currents*.'

"For instance on the 10th November, 1871, and on the 4th February, 1872, earth-currents of considerable strength had been observed in all the lines throughout India, and the submarine cables terminating on its shores. These great electrical disturbances were by no means local, but existed almost simultaneously throughout the earth, shewing us a most interesting feature of our planet.

"The fact of the secular changes of the earth-magnetism occupying such a long period as about 1000 years (the principal magnetic pole moving round the astronomical pole in 1000 years) pointed most probably to a cause external to the planet. If he were allowed to follow his own imagination, he would say, that earth-magnetism, its diurnal and secular variations, auroræ boreales and australes and electrical disturbances, weak or intense, in the planet, were all due to the movement of the earth and of the heavenly

bodies generally. That the great electric convulsions observed from time to time were nothing but the Telegraph signals transmitted from far distant regions to our planet, indicating great physical changes in the universe, long before, if ever, they could be felt by the more rough instruments—light, heat and gravitation—at present the only means by which we recognize our kinship with the outer world.

"It could be, therefore, easily perceived how important it was to investigate such a phenomenon (probably of all the most widely connected) by direct measurements.

"Now if such electrical disturbances only existed by fits and starts, as was the case during magnetic storms, it would be almost hopeless to attempt a general system of measurement. This was, however, fortunately not the case, since these earth-currents, which during magnetic storms became so violent, seemed to exist permanently, only of very feeble strength, and it was on this subject that he would give some observed facts."

The general outline of the rest of Mr. Schwendler's communication will be best given in extracts from his paper, which will be printed in full in Part II of the Journal.

Mr. Schwendler says:

"The currents observed at all hours of the day and all seasons of the year, in every line throughout India, may be obviously due to many different causes acting separately or conjointly. These currents I have designated "natural currents," to indicate the fact of their being in the lines without any direct, or at least intentional, human agency. The causes which may produce natural currents in Telegraph lines are:—

1. Galvanic action between the earth plates.
2. Polarization of the earth plates by the signalling currents.
3. Polarization of badly insulated points in the line.
4. Atmospheric electricity.
5. Thermo-electricity.
6. Inductive capacity.
7. Voltaic induction.
8. Earth currents.

The latter must be considered as produced by an actual difference of potentials between the two points of our planet with which the ends of a Telegraph line are in contact.

Surely if these "earth-currents" do permanently exist, and further, if they are strong enough to overpower the others, which are evidently of a much more accidental and less permanent nature, then a large number of quantitative observations, judiciously reduced and conveniently compiled, should at least show the tendency of the general law that governs them in strength and direction, leading perhaps finally to the true explanation of the earth's magnetism and the causes of its variations.

Such were in short my reasonings when in 1868 I was entrusted by Colonel Robinson, the Director General of Telegraphs, with the introduction of a system of testing the lines in India, and, although the practical objects of that system had nothing whatsoever to do with the solution of the problem, yet the fact that in each test measurements had to be made with positive and negative currents (for the very purpose of eliminating the influence of the natural currents) secured all the data necessary for the quantitative determination of the electromotive force in the line, to which the natural current must be considered proportional, involving only a slight additional calculation without any extra observations. To this end the necessary provisions were made and instructions issued; and in this manner more than 10,000 electromotive forces, producing the natural currents in the lines of India, have been calculated from the tests made between 1868 and 1872, and are now at our disposal; and although the results of these numerous observations have not as yet been all analyzed, or even compiled, yet in many special cases, and for limited periods, this has been done, and from these we are justified in stating the following as facts:—

1. All the lines in India are affected by natural currents.
2. From more than 10,000 observations it has been established that the prevailing flow of these currents between any pair of stations is as of a copper current from the east to the west; but which is the true direction, or that of maximum intensity, and further whether there is only one such direction, has not been computed as yet.
3. The strength of the natural current in one and the same line is very variable.
4. The direction of the natural current in one and the same line, though also variable to a certain extent, is, however, far more constant than its strength, and out of a number of observations there is generally a marked preponderance of currents flowing in the same direction.
5. The variation in strength and direction of the natural currents in parallel lines of the same length, is far more uniform than might have been expected, considering the many accidental influences to which long overland lines are exposed.
6. The prevailing direction of the natural current in any line is generally also the direction of the maximum current observed, but this is not the case invariably.

These general facts point to *one* probable conclusion, namely, that "*earth-currents*" do permanently exist in the lines of India, though they are often, and under certain circumstances, even much, obscured by many other causes, of commensurate magnitude, but more unstable and accidental in character.

For example, the two Railway lines between Bombay and Madras, one of which is very perfect in insulation, while the other is quite the reverse, both exhibit a copper current flowing permanently from Madras towards Bombay; and this fact, having been ascertained from a large number of tests, extending over a considerable period, and made from both Madras and Bombay, proves that the cause is a general one with respect to time, and that the method and place of measurement do not influence the direction of the current observed. Further, as one of the wires is used for the through traffic towards Bombay, while the other is used for the through traffic towards Madras, and as both circuits are worked with copper currents, the natural currents, which flow in the same direction in the two wires, certainly cannot be due to the polarization of the earth-plates or of faulty places in the lines. The average electromotive force in these wires is about 4.5 Daniells, and maxima of 15 and 20 Daniells are occasionally reached.

I consider it, therefore, established that "*earth-currents*" do permanently exist in the lines of India, their general drift being from east to west, and that we should be now justified in establishing a special system for the purpose of observing them, according to a uniform plan and with improved test methods."

Mr. Schwendler concluded by saying that, based on the facts above stated, he had proposed to the Council of the Asiatic Society to urge on Government the introduction of a system of measurement of *earth-currents*; that the Council had received the proposal most warmly, and had appointed Colonel Hyde, Mr. R. S. Brough, and himself, to work out a practical system; and that Colonel Robinson, the Director General of Telegraphs, had intimated his kind co-operation in the matter.

The reading of the following papers was postponed.

Note by Colonel E. T. Dalton, C. S. I., on a Picture representing the taking of Palámau by Dáud Khán, Aurangzib's general.

Contributions towards a knowledge of the Burmese Flora. By S. Kurz, Esq.

The receipt of the following communication was announced.

1. Ahom Comparative Letters, No. 2. By J. M. Foster, Esq.

LIBRARY.

The following additions have been made to the Library since the meeting held in May last.

Presentations.

Names of Donors in Capitals.

Proceedings of the Royal Society of London, Vol. XXII, No. 150.

F. A. Abel.—Contributions to the History of Explosive Agents.—Second memoir.
J. Tyndall.—Experimental Demonstrations of the Stoppage of Sound by partial Reflections in a non-homogeneous Atmosphere. *J. F. Buchanan.*—On the Absorption of Carbonic Acid by Saline Solutions.

THE SOCIETY.

Proceedings of the Royal Geographical Society of London, Vol. XVIII, No. 11.

T. D. Forsyth.—Indian Government Mission to the Atalk-Ghazi. *Bushell.*—Notes of a Journey outside the Great Wall of China. *Phillips.*—Notes on Southern Mangi. *Millingen.*—Notes of a Journey in Yemen.

THE SOCIETY.

Journal of the Statistical Society of London, Vol. XXXVII, Part I.

H. Beverley.—The Census of Bengal.

THE SOCIETY.

The Numismatic Chronicle and Journal of the Numismatic Society of London, 1873, Part IV.

M. Hy. Sauvage.—A Dinar of Salih Ebn Mirdas of Aleppo. *S. E. L. Poole.*—On the Coins of the Urtukis.

THE SOCIETY.

Proceedings of the Zoological Society of London, 1873, Parts 1-2.

Part I. *J. S. Bowerbank.*—Report on a Collection of Sponges found at Ceylon by E. W. H. Holdsworth. *E. W. H. Holdsworth.*—Note on the occurrence of *Xenospongia patelliformis*, Gray, on the Coast of Ceylon. *Dr. J. E. Gray.*—Notes on Mud-Tortoises (*Trionyx*, Geoffroy), and on the Skulls of the different kinds. *A. H. Garrod.*—On the Visceral Anatomy of the Sumatran Rhinoceros (*Ceratorhinus Sumatrensis*). *Surgeon-Major F. Day.*—On some new or imperfectly known Fishes of India and Burma. *E. Blyth.*—Exhibition of, and remarks on, some Tiger Skins (*Felis tigris*) from India, Siam and Siberia.

Part II. *G. E. Dobson.*—On Secondary Sexual Characters in the *Chiroptera*. *W. T. Blanford.*—Notes on the Gazelles of India and Persia with Description of a new Species. *H. Bruce.*—A List of the collections of Diurnal *Lepidoptera* made by Mr. Lowe in Borneo with Descriptions of new Species. *R. Swinhoe.*—On a Scaup Duck found in China.

Transactions of the Zoological Society of London, Vol. VIII, Part 6.

Professor Owen.—On the Osteology of the *Marsupialia*. On *Dinornis*.

THE SOCIETY.

Minutes of Proceedings of the Institution of Civil Engineers, Vols. XXXV-VI.

Vol. XXXV. *Col. Greathed*.—Irrigation in Northern India. *J. Milroy*.—Cylindrical Foundations. *W. P. Thornton*.—State Railways of India.

Vol. XXXVI. *J. Head*.—Steam Locomotion on Common Roads.

THE INSTITUTION.

Proceedings of the Institution of Mechanical Engineers, Birmingham. Cornwall Meeting, July 1873, Part II.

THE INSTITUTION.

Proceedings of the Royal Institution of Great Britain, Vol. VII, Parts 1-2.

Part I. *R. H. Scott*.—On recent progress in Weather Knowledge. *Capt. E. D. Lyon*.—On the Mythology and Temples of India.

THE ROYAL INSTITUTION.

Bulletin de la Société de Géographie de Paris, Mars, 1874.

THE SOCIETY.

Bijdragen tot de Taal-land-en Valkenkunde van Nederlandsch Indië, 3rd series, Vol. VII, Parts 3-4 and Vol. VIII, Part 1.

Vol. VII. 3-4. *P. C. Cambier*.—Rapport over Tidoreesch-Halmahera.

Vol. VIII. 1. *A. B. Cohen Stuart*.—Nog iets over de opschriften van Menangkabau op Sumatra. *P. A. Leupe*.—Salomon Sweers, raad van Indië, 1644. *A. J. A. Gurlach*.—Een tweetal bijdragen over het noorden van Sumatra.

THE NETHERLANDS-INDIAN SOCIETY OF SCIENCE.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, 1874, Februar.

THE ROYAL PRUSSIAN ACADEMY.

Verhandlungen der Kaiserlich-Königlichen Zoologisch-botanischen Gesellschaft in Wien, Band XXII.

THE I. R. ZOOLOGICAL AND BOTANICAL SOCIETY OF VIENNA.

Catalogus Codicum Latinorum Bibliothecae Regiae Monacensis, Tom. 1, Pars III; Tom. II, Pars II.

THE HUNGARIAN ACADEMY OF SCIENCE.

Proceedings of the Boston Society of Natural History, Vol. XV, Parts 1-2, 1872.

Transactions of the Boston Society of Natural History, Vol. II, Part II, Nos. 2 and 3.

THE SOCIETY.

Memoirs of the American Academy of Arts and Sciences, Vol. IX, Part II.

THE ACADEMY.

Monthly Reports of the Department of Agriculture, for 1871 and 1872.

THE GOVERNMENT OF THE UNITED STATES OF AMERICA.

Smithsonian Contributions to Knowledge, Vol. XVIII.

THE SMITHSONIAN INSTITUTION.

Reports of the Archaeological Survey of India for 1871-72, Vol. IV.

J. D. Beglar.—Delhi. *A. C. L. Carllegle*.—Agra.

THE GOVERNMENT OF INDIA.

A Supplementary Catalogue of Sanskrit works in the Sarasvati Bhandaram Library of His Highness the Maharaja of Mysore.

THE GOVERNMENT OF BOMBAY.

Vital Statistics of the Bengal Presidency, Vols. 1-3

Dr. J. Bryden.—Annual returns of the European Army of the Bengal Presidency and of the Jails. Cholera Epidemics of Recent years. Age and Length of Service as affecting the Sickness and Mortality of the European Army.

THE GOVERNMENT OF INDIA.

Report on the Police Administration of the Central Provinces for 1873.

Report on the Judicial Administration (Criminal) of the Central Provinces, for 1873.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Meteorological Observations made at the Magnetic and Meteorological Observatory at Simla during the years 1841-45.

THE GOVERNMENT OF INDIA.

Report on the Revenue Survey Operations of the Lower Provinces 1872-73.

Records of the Geological Survey of India, Vol. VII, Parts I-II.

Part I. *Dr. F. Stoliczka*.—A brief account of the Geological Structure of the Hill-Ranges between the Indus Valley in Ladak and Shah-i-dula, on the Frontier of the Yarkand Territory. *T. W. H. Hughes*.—Notes on the Raw Materials for Iron Smelting in the Raniganj Field. *H. B. Medlicott*.—Note on the Habitat in India of the Elastic Sandstone, or so-called Italcumyte. *F. R. Mallet*.—Geological Notes on Northern Házáribágh.

Part II. *Dr. F. Stoliczka*.—Geological Notes on the Route traversed by the Yarkand Embassy from Shah-i-dula to Yarkand and Kashgar. *Dr. F. Stoliczka*.—Note regarding the occurrence of Jade in the Karádash Valley on the southern borders of Turkistan. *H. B. Medlicott*.—Coal in the Garo Hills. *V. Ball*.—On the Discovery of a new locality for Copper in the Narbada Valley. *T. W. H. Hughes*.—Petroleum in Assam.

General Report on Public Instruction in Bengal for 1872-73.

THE GOVERNMENT OF BENGAL.

Report of the Chemical Examiner, Panjáb, for 1873.

THE GOVERNMENT OF THE PANJÁB.

Asaland af C. A. Holmboe.

THE AUTHOR.

Report by the Electrical Superintendent, Government Telegraph Department, for 1872-73.

L. SCHWENDLER, Esq.

Photozincographed Specimens of Indian Handwriting in various Vernacular characters, collected in the Agra Dead-Letter Office by the Post-Master-General, N. W. Provinces.

CAPT. J. WATERHOUSE.

Mahágurú-nipáter-para- As'anchávastháya, Kartavyakartá byer Vichára.
BA'BU RA'JENDRALA'LA MITRA.

Aitihásika-rahasya, Part I, by Rámadása Sena.

THE AUTHOR.

Kitábu uçúl ilalsinah wallughát, by Sayyid Karámat 'Alí, of Jaunpur.

THE AUTHOR.

Two MS. treatises in Persian. "On the Lawfulness of Food" and "On Muharram Ceremonies" by Sayyid Karámat 'Alí.

THE AUTHOR.

The Christian Spectator, Vol. III, Nos. 34 and 35.

THE EDITOR.

Rámáyana, Vol. 5, No. 3, edited by Hemachandra Bhattachárya.

THE EDITOR.

Purchase.

Wörterbuch zum Rig-Veda von H. Grassman. Liefr. 3.

Revue Archéologique, 1874, Février et Mars.

Le Comte A. de Gobineau.—Catalogue d'une collection d'intailles Asiatiques (chiefly from Persia and Mesopotamia).

Revue des Deux Mondes, 1874, Mars 1-15, Avril 1.

Mars 1. *H. Blerzy.*—Les révolutions de l'Asie Centrale.

Mars 15. *H. Blerzy.*—Les révolutions de l'Asie Centrale. L'Afghanistan et la Transoxiane.

Revue de Linguistique, Tome 1, fasc. I-II.

Fasc. I. *F. Justi.*—Note sur les mots étrangers en Kurde.

Fasc. II. *L. Adam.*—Grammaire Tongouse. *Van Eijs.*—Le pronom démonstratif Basque.

Fasc. III. *L. Adam.*—Grammaire Tongouse. *J. Vinson.*—Le Verbe Basque. *A. Hovelacque.*—Morale de l'Avesta.

Revue et Magasin de Zoologie, 1874, Nos. 1-2.

No. 1. *Dr. Jousseau.*—Description de quelques nouvelles espèces de coquilles appartenant aux genres *Murex*, *Cyprea* et *Natica*.

Journal des Savants, 1874, Février, Mars.

Février. *A. De Quatrefages.*—Etude sur les Todas.

Mars. *Barthelémy Saint Hilaire.*—L'Outtarakanda.

Comptes Rendus, 1874, Nos. 7-13.

No. 7. *M. M. Dujardin, Beaumetz et Hirne.*—Des propriétés antifermentescibles et antiputrides des solutions d'hydrate de chloral.

No. 8. *M. H. de Parçille.*—Sur un nouvel appareil pour enregistrer la direction des nuages.

No. 9.—*M. H. Ryasson*.—De l'action du chloral sur l'albumine. *M. Oré*.—De l'anesthésie produite chez l'homme par les injections de chloral dans les veines (suite). Tétanos traumatique traité par les injections. Guérison.

No. 10. *M. A. Hatzfeld*.—Note relative à l'emploi du sulfate de cuivre, comparé au tannate de fer, comme agent conservateur des bois.

No. 11. *M. H. Resal*.—Note sur l'emploi des lames flexibles pour le tracé d'ares de courbe d'un grand diamètre. *M. Berthelot*.—Sur les hydrates cristallisés de l'acide sulfurique. *P. Secchi*.—Recherches expérimentales conduisant à une détermination de la température du Soleil. *M. Elie de Beaumont*.—Rapport, sur les travaux géodésiques relatifs à la nouvelle détermination de la méridienne de France, fait au nom d'une Commission nommée dans la séance du 16 Décembre, 1872.

No. 13. *M. L. Pasteur*.—Observations verbales au sujet de la communication récente de M. Alph. Guérin sur le rôle pathogénique des ferments dans les maladies chirurgicales. *M. P. Bert*.—Recherches expérimentales sur l'influence que les changements dans la pression barométriques exercent sur les phénomènes de la vie.

The London, Edinburgh and Dublin Philosophical Magazine and Journal of Science, Vol. 47, Nos. 311, 312.

No. 311. *J. Croll*.—On Ocean-Currents.—Part III. On the Physical Cause of Ocean-currents. *F. Chambers*.—On the Diurnal Variations of the Wind and Barometric Pressure at Bombay.

No. 312. *H. Vogel*.—On the Sensibility to Light of Bromide of Silver with respect to the so-called Chemically Inert Colours. *Professor Challis*.—A Theory of the Effects produced by Fog and Vapour in the Atmosphere on the Intensity of Sound.

The Annals and Magazine of Natural History, 1874, March and April.

No. 75. March. *H. B. Brady*.—On a true Carboniferous Nummulate.

No. 76. April. *Dr. J. E. Gray*.—On the Arrangements of Sponges. *E. D. Cope*.—The Succession of Life in North America.

The American Journal of Science and Arts, 1874, February and March.

February. *S. P. Langley*.—On the Minute Structure of the Solar Photosphere. *D. Boboulieff*.—On the Dissipation of Electricity in Gases.

March. *J. Blake*.—On the connection between Isomorphism, Molecular Weight and Physiological Action. *M. Carey Lea*.—On the Influence of Colour upon Reduction by Light. *J. F. Whiteacres*.—On recent Deep-sea Dredging Operations in the Gulf of St. Lawrence.

The Quarterly Journal of Science, 1874, April.

H. Deacon.—On the Modern Hypotheses of Atomic Matter and Luminiferous Ether.

The Quarterly Journal of Microscopical Science, No. 54.

E. Haeckel.—The Gastraea theory, the Phylogenetic Classification of the Animal Kingdom and the Homology of the Gerin-Lamellae. *Rev. M. J. Berkeley*.—Atmospheric Micrography.

The Westminster Review, 1874, April.

Pangenesis. The Development of Psychology.

Stray Feathers, 1873-74.

Conchologia Iconica, Parts 312, 313.

Stomatella, Stomatia, Gena, Solen, Adcarbii, Teinostoma, Broderipia.

Exchange.

The Athenæum, February and March 1874.

Nature, Nos. 232-235.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR JULY, 1874.

The monthly general meeting of the Society was held on Wednesday, the 1st instant, at 9 o'clock p. m.

Col. H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The receipt of the following presentations was announced—

1. From the Government of Bombay, four cases of books and maps published by the Bombay Government, and other miscellaneous works.

2. From W. B. Martin, Esq., three silver punch coins found in making a relief-work road in Madhupura.

3. From Captain J. Waterhouse, a set of seven photozincographed plates of sketches of the Nágas, drawn by Lieutenant W. G. Woodthorpe, R. E.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected Ordinary Members—

D. M. Gardner, Esq. (Re-elected.)

Dr. J. Scully.

Captain S. H. Cowan.

Captain T. B. Michell.

Dr. G. Watt.

W. G. Molesworth, Esq., C. E.

Captain T. Deane.

Col. H. Drummond, R. E.

Major H. A. Mallock.

The following are candidates for ballot at the next meeting—

Captain H. C. Marsh, 18th Bengal Cavalry, Barrackpore, proposed by Col. H. Hyde, seconded by Mr. H. Blochmann.

Lieut.-Col. G. A. Searle, D. P. W., Bengal, Irrigation Branch, proposed by Captain J. Waterhouse, seconded by Mr. H. Blochmann.

A. W. Chennell, Esq., Topographical Survey, proposed by Mr. J. Wood-Mason, seconded by Captain J. Waterhouse.

Lieut. R. Wace, R. A., has intimated his desire to withdraw from the Society.

The Council reported that the following stores and equipment for Deep-sea Dredging operations had been received from England.

Iron Dredgers,	3
Indian rubber accumulators,	30
Sieves, copper wire, set of 4,	set 1
" " " 5,	1
Globular Basket, copper,	1
Scoop,	1
Trays, copper gauge,	2
Coil, copper wire,	1
Baskets of stone Jars, (6)	12
" " (4)	6
Microscope,	1
Deep sea Thermometers,	10
Chemical apparatus, Hydrometer.	

The Council also announced that arrangements had been made for the Library being open on Friday mornings from 7 o'clock A. M., to suit the convenience of those members whose official duties prevented them from visiting the Library during the day-time.

The President then announced to the meeting the sad intelligence of the death of Dr. F. Stoliczka, late Natural History Secretary of the Society, on the return journey from Yarkand. He said—

GENTLEMEN,—With a sorrow-laden heart I rise to announce to you that which the gloom that sits upon us all, tells me is already too well known. Would that it had not been my sad task to tell you that Dr. Stoliczka, our late Secretary, has been taken from among us—let us trust to happier and brighter worlds, surely the reward of such nobility of mind, such singleness of heart, such honesty of purpose, such unselfish devotion of a life to his duty in this wide world, to the advancement of his fellow man.

The loss cannot be his—but to us—to this Society he loved so well; to this Government he served so faithfully; to those of all nations and languages who laboured in the same path, and among whom he was rising as one to guide and to lead, his loss is irreparable.

Of the manner of his death we know nothing; all we learn is, that he died on the other side of Leh on his return with the Expedition from Yarkand which he had joined for the purpose of investigating the geological problem of High Central Asia, a work that had for years been the dream of his life.

Gentlemen, when I look round this table to his accustomed seat, when I call to recollection Dr. Stoliczka, a man among whose friends I felt it an honour to be numbered, when I call to mind all that he did for

this Society and the strength he gave it, I can hardly realize the void his death has caused.

The story of his bright, short life, so sadly in honour ended, is to be told, but at some other time, for my heart is full, sorrow stifles my speech, and all that I can now do is to submit my proposition that this Meeting adjourn in mourning as a tribute of respect for our late Secretary, Dr. Stoliczka.

Mr. Medlicott said—

As a member of the Asiatic Society I join in the tribute of sorrow we collectively pay to the memory of our very distinguished Natural History Secretary. But I may be permitted to add, that as a member of the Geological Survey of India, I have, if possible, still greater cause to lament the untimely fate that has befallen Dr. Stoliczka. To that service his labours for the last twelve years have been chiefly devoted. As Palæontologist to the Geological Survey of India he had, only just before starting with the Mission to Kashgar, completed his voluminous work on the Cretaceous Fauna of Southern India, which will be the chief monument of his great power as a naturalist.

The work he himself had most at heart, his enthusiasm for which has at last cost him his life, was the Geology of the Himalaya. Before coming to this country, he had, as a member of the Geological Survey of Austria, done good work in Alpine geology, and he was naturally tempted to carry on those studies in the greater field of the Himalaya. What we do know of those difficult regions, is principally from his work, accomplished in the summers of 1864 and 1865.

In May of last year, he had made arrangements to visit Vienna, where no doubt he would have met with a worthy reception among men who know how to value scientific work; but when he heard of the intended Mission to Yarkand, he eagerly volunteered to go as Geologist and Naturalist, giving up without a thought the tempting opportunity of a trip to Europe. He did so too against the advice of some of his best friends, who knew how severely the hardships of mountain travel had told upon him on the occasion of his last visit to Tibet. These fears were alarmingly fulfilled in the dangerous attack he suffered from in crossing the passes in October last. He was able, however, to make good use of his opportunity; and the latest letters received from himself, gave us much hope that in crossing the mountains at a less trying season, he would return in safety. He wrote in great spirits, expressing his satisfaction at the observations and collections he had been able to make. Those hopes are now for ever gone; and the materials so exulted over are comparatively lost, without the informing mind of the accomplished observer who gathered them.

The reading of the following papers was postponed—

1. Note on a picture representing the Taking of Palámau by Dáúd Khán, Aurangzib's General. By Col. E. T. Dalton, C. S. I., Commissioner of Chutia Nágpúr.

2. Note on Fort Ekdálah, near Panquah, Máldah District, by E. V. Westmacott, Esq., C. S.

3. Contribution towards a knowledge of the Burmese Flora. By S. Kurz, Esq.

The receipt of the following communication was announced—

Descriptions of nine species of *Alyceinae*, from Asám and the Nágá Hills. By Major H. H. Godwin-Austen F. R. G. S., F. Z. S.

The meeting was then adjourned.

LIBRARY.

The following additions have been made to the Library since the meeting held in June last.

Presentations.

. Names of Donors in Capitals.

Professional Papers on Indian Engineering, May 1874.

Major E. T. Thackeray.—Artesian boring at Ambála. Capt. A. Cunningham.—Review of paper on Well-Foundations. Capt. A. Cunningham.—Reduction of Barometrical Readings at High Stations. W. Bull.—Bull's Fixed Clay-Cutter. Major G. P. de P. Falconnet.—Brick and Tile manufacture at Allahabad. C. H. G. Jenkinson.—Designs of Girder Bridges for Metre Railways. W. H. Price.—Kurrachee Harbour Works.

THE EDITOR.

The Indian Antiquary, May and June, 1874.

May. C. E. Kenneth.—Note on the Sects of the Vaishnavas in the Madras Presidency. W. F. Sinclair.—Notes on Castes in the Dekkan. Professor Ramkrishna Gopal Bhandarkar.—The Veda in India. V. N. Narasimhaizengar.—Tonsure of Hindu Widows. Capt. S. J. Mackenzie.—Panchanga or Indian Almanac. Report of the Exploration of the Buddhist ruins at Jámálgarhi.

June. L. Rice.—Bhadra Bahu and Sravana Belgola. Dr. Leitner's Buddhist Sculptures. M. J. Walhouse.—Archaeological notes. Dr. J. Muir.—Passages expressing religious and moral sentiments from the Mahabharata. V. Ball.—Visit to the Andamanese "Home," Port Blair, Andaman Islands.

THE GOVERNMENT OF INDIA.

Report on the Judicial Administration of the Central Provinces (Criminal) for 1873-74.

THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Purchase.

Stray Feathers, Vol. I, and Nos. 1-5 of Vol. II.

Pratna Kamra-Nandini, Vol. VII, No. 1.

Exchange.

Nature, Nos. 236-239.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR AUGUST, 1874.

A meeting of the Society was held on Wednesday, the 5th instant, at 9 o'clock P. M.

Colonel H. Hyde, R. E., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table :—

1. From O. H. Brookes, Esq., a model of a war-canoe from the Nicobar Islands, two pig-sticking spears and three fishing spears, used by the Nicobarese.

2. From Dr. Wise, two photographs, taken by Mr. A. Caddy, of the Rājbarī Mat'h on the left bank of the river Padma, where the old city of Sripūr stood.

A lithograph of the temple will be published in Journal, Pt. I, No. 3 for this year.

3. From Whitley Stokes, Esq., a copy of "Ancient Laws of Ireland," Vol. III, and a copy of "Manners and Customs of the Ancient Irish." By E. O'Curry, Vols. I, II, III.

On the motion of the President, a vote of thanks was passed to Mr. Stokes for his frequent contributions to the Library.

4. From the Author, a copy of "L'Islamisme d'après le Coran," by Mons. Garcin de Tassy.

5. From the Supdt., Great Trigonometrical Survey of India, a copy of Synopsis of G. T. Survey Results, Vol. I. Great Indus Series.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected ordinary members—

Captain H. C. Marsh.

Lieut.-Col. G. A. Searle.*

A. W. Chennell, Esq.

The following are candidates for ballot at the next meeting—

A. Constable, Esq., proposed by Col. F. W. Stubbs, seconded by Captain J. Waterhouse.

* Colonel Searle's election has since been cancelled at his own request.

Baboo Bhuggoiibutty Churun Mullick, proposed by Hon'ble Maulavi Abdul Latif Khan Bahádur, seconded by Mr. Blochmann.

R. Knight, Esq., Assistant Secretary to the Government of Bengal, proposed by Captain J. Waterhouse, seconded by Mr. Blochmann.

The following gentlemen have intimated their desire to withdraw from the Society—

Col. D. Brown, Moulmein.

E. Buck, Esq., C. S., Naini Tal.

The Secretary read the following report on an extraordinary phenomenon observed at the Nicobars on the 31st May, 1874, communicated by the Home Department.

Extract from the Proceedings of the Government of India in the Home Department (Port Blair), under date the 8th July, 1874.

Read the following extract from the Report on the affairs of the settlement of Port Blair and the Nicobars for the month of May, 1874.

"On the 31st of the month, at about 5.30 P. M., an extraordinary phenomenon was observed. The sky at the time was quite clear and the weather fine. I was out sailing in my boat, when suddenly a luminous body darted from the heavens from north to south. When first observed, it was like an ordinary meteor with a long tail. In its progress, it seemed as it were to slide into two distinct meteors attached to each other by the tail of the first thus *——*——, and then, after a further rapid progress, it appeared to burst into eight parts, and disappeared from view.

"I have never witnessed so strange a spectacle before, and mention the occurrence here in the hope that it may have been observed in India, and that a more perfect account of it may be forthcoming from some scientific individual."

The President remarked that the phenomenon observed was very similar to a very bright meteor seen in the Panjáb some time since; it was however, very remarkable that in the present instance no report had been heard. The meteor must have been extraordinarily bright to have been visible in the afternoon in the month of May.

Mr. Blochmann exhibited a bronze figure found in a compound at Pasháwar, received from Col. Ruggles, XIXth Regt., P. N. I.

The figure represents a lute player. It is unfortunately too oxidised to shew details of face and dress.

The Hon. E. C. Bayley, C. S. I., exhibited a coin of Ghiyás ud-din A'zam Sháh and made the following remarks upon it:

A few days ago, I had the opportunity of examining a small "trouvaille"

of silver coins discovered recently in the Mudhobani Subdivision of the Tirhut District. They are 36 in number and were chiefly of the Bengal king Jalāl ud-dīn Muhammad, though there were also coins of three other Bengal kings, Sikandar bin Ilyās, Ghiyās ud-dīn A'zam Shāh-bin Sikandar-bin Ilyās and (one coin of) Shihāb ud-dīn Bāyazīd Shāh. All these coins are of published types and, with one exception, are not remarkable. I, therefore, propose only to trouble the meeting with a few remarks as to that one. This professes to be a coin of Ghiyās ud-dīn A'zam Shāh abovementioned. Now the dates given by the native writers as to this part of Bengal history are very confused, indeed manifestly wrong. It is generally stated that, for example, Ghiyās ud-dīn died in 775, A. H., and it is said that before reigning at all, he was in rebellion against his father, who was eventually killed in resisting him. This latter part of the story is corroborated by the coins which have been found; for we have a parallel series both of father and son which range over a period of no less than four years. But the earliest date with which coins of Ghiyās ud-dīn are stamped, is no less than thirteen years after the alleged date of his death, or 788 A. H., and his father's coins are found with dates ranging up to 792 A. H., after which year a regular series of the coins of Ghiyās ud-dīn only have been found with dates as late as 799. It is also related by the historians that Ghiyās ud-dīn reigned somewhat in excess of 7 years, which would bring his latest date down to 799, or at most 800 A. H., more probably 799.

It is also stated that he was succeeded first by one son Saif ud-dīn, who is stated to have reigned ten years,* and then by another who is recorded to have had a reign of little more than two years. Accepting these periods and fitting them to the dates obtained from the coins as already noticed, the second son of Ghiyās ud-dīn would probably have ceased to reign in 811 or 812 A. H., probably the latter. The historians go on to say that this monarch was dethroned by an Hindū Rājā of "Bhatauriah," called "Kānis" (which is perhaps "Ganēsh"), who is said to have reigned seven years, a term which would bring his reign down to 818.

Hitherto we have had numismatic information by which to test this relation only on three points, *viz.*, the succession of the Hindū Rājā by his son, who was a Muhammadan and reigned under the designation of Jalāl ud-dīn Muhammad, of whose coins a pretty full series has been found with dates from 818 onwards.† This date would accord nearly exactly with the lengths

* The Riyāz us-salātīn quoted by Mr. Blochmann gives somewhat differing periods, but the total is greater; and for this reason, and because the only published dates of Saif ud-dīn's coinage accord better with the other accounts, I prefer the latter. Stewart who knew the Riyāz us-salātīn seems to have rejected its authority as to this period.

† His dates found in this "trouvaille" are 818, 819, 822, 823, 824.

of the various reigns as generally stated by the historians. Mr. Blochmann, however, who has paid much attention to the subject, is inclined to assign a somewhat earlier date, *viz.*, 816 as that of the accession of this monarch, which would involve a correction of nearly two years in the total of about nineteen years, which the historians give to the three preceding reigns.

The second piece of evidence is that of a coin of a king styling himself Shihāb ud-dīn Bāyazīd Shāh, which has been published by Mr. Blochmann with the dates 812 and 816. History is silent as to this king or as to any one who assumed these titles; possibly he was a pretender, or, as Mr. Blochmann has suggested, he was a puppet king set up by Rājā Kānis, or some other aspirant to power, who virtually reigned in his name; his dates all fall within the probable period of Rājā Kānis's authority. There is one coin, as I have said, in the present batch of Bāyazīd Shāh, unfortunately the upper part of the last figure of the date is out of the field of the coin.

The third evidence consists in the coinage of Ghiyās ud-dīn A'zam Shāh's elder son, Saif-ud-dīn, whose coins have been published by Mr. Laidlay and by Mr. Blochmann. Only one coin published by the latter has, however, an imperfect date, but as that is a four, it can only stand for 804, A. H.

The coin which I have now laid before the meeting, adds a fourth piece of evidence and professes to be, as already said, a coin of Ghiyās ud-dīn A'zam Shāh. It differs only from the coin figured by Mr. Laidlay as Fig. VI, pl. IV, in Vol. XV of the Society's Journal, in the date, which is remarkable, being very clearly 812. Now, though the histories of this time are demonstrably wrong in the dates they assign to Ghiyās ud-dīn, yet it seems unlikely that the whole of the details which they give should be erroneous; and that his reign exceeded, by some twelve or thirteen years, the length universally attributed to it, or that he should have returned to the throne after it had been certainly occupied by his son Saif ud-dīn, is highly improbable. I do not, therefore, believe that Ghiyās-ud-dīn was alive when this coin was struck; in other words, I believe it to be a posthumous coin, struck by some one else for special reasons in the *name* of Ghiyās ud-dīn.

If so, this is by no means a singular instance of the practice. There is an exactly parallel example, and a contemporary one, too, to be found in the coinage of Delhi, as may be seen from pp. 328 to 330 of Mr. Thomas's 'Chronicles of the Pathan Kings of Delhi,' where it is demonstrated that Daulat Khān Lodī and Khizr Khān struck coins in the name of their deceased predecessors, though with the correct date of the year in which the coins were minted. Mr. Thomas refers to a similar case in the adoption by the East India Company of Shāh 'Ālam's coinage, though ultimately the Company contented itself with reproducing the coinage of Shāh 'Ālam's nineteenth year.

A more recent and more exactly corresponding example, however, is that of Khán Bahádur Khán who held the executive authority in Rohilkhand for about a year during the mutiny in 1857-58. He was not strong enough himself to assume the regal position and style, and while the Mughuls and the Mahrattas were both struggling, with fair chances of success, for the supreme power, he feared to offend either by acknowledging the supremacy of the other. He solved the difficulty, as Khizr Khán had done before him, by striking coins of Sháh 'Alam with the proper "julús" year, as if Sháh 'Alam had continued reigning down to that date.

Probably similar motives were at work in Bengal when this coin was struck. The feelings of their supporters would hardly have allowed the reigning sovereigns, whoever they were, expressly to acknowledge the supremacy of Timur and his successors. On the other hand, the dread of the Tartar invaders was evidently great, and the local sovereigns would hardly dare to put forth their pretensions to regal state so prominently as was involved by the striking of coins in their own names.

How strong this feeling of dread was even in Bengal, and down to a much later date, is shown by very curious evidence. A successor of Jalál-ud-dīn Muhammad having been hardly pressed by the ruling king of Jaunpúr applied for his interference to Sháhrukh, the son of Timur, then reigning at Hirát, who in reply sent a peremptory order to the king of Jaunpúr to desist from all interference with the affairs of Bengal. It is recorded that, as a fact, this interference did subsequently cease, and the Bengal king in gratitude sent an embassy with presents to Sháhrukh, who again, despatched a return embassy, a fact to which we owe one of the best books of that period, the *Maṭla' us-Sa'dain*, which was written by Sháhrukh's ambassador as a record of the observations made, and information collected, by him during his visit to India.

It may be feared, therefore, that with the possible exception of the coins of some obscure pretender, little information further than that we have already, is likely to be gathered from numismatic sources for the adjustment of the confused period of history occurring between Ghiyās ud-dīn's death and the accession of Jalál ud-dīn Muhammad. No coins of Rájá Kánis or Ganesh have yet been found (unless indeed he himself assumed the title Báyzid Sháh, a supposition hardly consistent with the historical accounts of his reign), and it seems improbable, since his reign was one of fair length and prosperity, that, if these existed, some would not have come to light with the coins of both earlier and later kings, which have been found in considerable numbers.

It is, I think, a fair conjecture that Saif ud-dīn desisted from coining on some threat from Timur (if the date on the coin quoted by Mr. Blochmann is correct, he must have continued coining in his own name long after the

sack of Dillī), or that on his death his successor, none of whose coins have been found, hesitated to set up a mintage of his own and adopted the harmless course of coining in the name of his deceased predecessor. At any rate, Rājā Kānis, or Ganesh, probably followed this policy, and to him or to Ghiyāṣ-ud-din's second son must probably be ascribed the coin now before our Society.

Mr. Blochmann laid before the meeting his translations and notes to the following readings of inscriptions received from Mr. T. W. Beale, Agra.

A'grah.

1.

The following inscription* is from the shrine of Shaikh 'Alá-uddin Majzúb, who died in A. H. 953, or A. D. 1546, during the reign of Islám Sháh. His shrine is in the Náí ki Mandí, A'grah; it has a small dome with Arabic Inscriptions inside the *gumbuz*, and is supported by eight stone-pillars, on one of which is the following (metre, *short hazaj*)—

علاءالدین مجذوب و خردمند * کز ز گشته روا مطلوب مرغوب
 بناگه شد نهان از چشم مردم * چونور شود گزیده از دیده مجذوب
 چو گفتم چیست تاریخ وفاتش * خرد گفتا علاء الدین مجذوب

۹۵۳

1. 'Alá-uddin Majzúb (*i. e.* the attracted, *viz.* by God), the wise, through whom desired objects are fulfilled,

2. Vanished suddenly from the eyes of men, as a ray disappears out of sight.

3. I asked what the date of his death was, and Genius replied 'Aláuddin i Majzúb.'

There are several tombs in the compound of the Dargáh; for the soil in which a saint reposes, is holy. Among the tombs may be seen those of Hakims Baqá Khán and Liqá Khán, who died in A. H. 1207 and 1215, respectively (A. D. 1792-93 and 1800).

Regarding 'Alá uddin himself, *vide* Miftáh ut-tawárikh, p. 155; Khazínat ul-A'fiá, p. 1056; Badáoní III, p. 61; Keene's Agra Guide, p. 47; and the Akhbár ul-Akhyár.

'Alá uddin's contemporary was Mír Rafi'uddin Muhaddis i Çafawí. His shrine has a dome supported by twelve pillars, and is situated in the Haweli of Aḥaf Jáh (Ja'far Beg, *vide* Ain Translation, I, p. 411), in Belanganj (Bluntganj), near the Bāns Darwázah, A'grah. The place where Rafi' uddin is buried, is also called Chauk Aḥaf Jáh; and it thus appears that the Chauk was built round about the shrine.

Rafi' uddin's Mausoleum bears no inscription.

* A reading of this inscription has also been received from Mr. E. Atkinson, C. S., N. W. P.

2.

The following is the inscription of a tombstone in the vicinity of 'Alamganj, Agra.

مرحومي تاتار خان ششم ماه رجب سنه ۱۰۱۹ برحمت حق پيوست .

The pardoned Tatar Khán joined God's mercy on the 6th Rajab, 1019 (14th October, 1610).

This refers neither to Tatar Khán of Akbar's reign, nor to Tatar Khán Bakáwulbeg of Jahángir's time.

3.

On a tombstone in the Muhammadan Burial Ground, west of the Nái kí Mandi is the following (metre, short *hazaj*)—

هزار افسوس از مرگ ابو الفتح * كه داغش يك جهان دردم فزوده
بباغ عدن از دست شهادت * در رحمت بروي خود كشوده
چو چشمش خفت تاريخ وفاتش * بگفتا هاتقم مظلوم بوده
۱۵ محرم سنه ۱۰۳۳

1. A thousand times alas! on Abul Fath's death, the sting of which has given me a world of pain.

2. In the garden of Paradise the door of God's mercy opened itself to him, because he was a martyr.

3. When his eye closed, a voice from heaven told me that the date of his death lay in the words '*Mazlûm búdah*,' 'he was a martyr.' 15th Muharram, 1033 [29th October, 1623].

4.

A short distance from Agra, on the road to Bhartpúr, is a small building adjoining a mosque. The place is commonly called Sarái Nabí Khán. The mosque was built by Khidmat Khán in 1037, or A. D. 1627-28, and bears the following inscription (*Rubá'í* metre)—

توفيق رفيق گشت خدمت خان را * كويافت حق سخاوت خامان را
تاريخ بنای مسجدش گفت خرد * آباد نمود خانه بزدان را

۱۰۳۷

1. Heaven favored Khidmat Khán, who obtained as a right the liberality of the court servants (?).

2. Genius expressed the date when his mosque was built (in the words), 'He built a house for God.' A. H. 1037.

In the adjoining small building 'a foot-print of the Prophet,' *Qadam Rasûl*, was shewn. Over its entrance, the following inscription is found (*Rubá'í* metre)—

یا اول	مراکات امید دل حاجت خواهست	یا مالک	این لوح که پیرایه مهر و ماعت	الله اکبر
یا آخر	نقش قدم خاص رسول الله هست	یا دائم	خدمت خان را خدا کرم کرده ز لطف	جل جلاله

1. This tablet, which is an ornament of the sun and the moon, is the mirror of the hopes of the heart* that wishes to have its pious desires fulfilled.

2. God has in His kindness bestowed favors on Khidmat Khán: this is the figure of the real foot of God's Prophet.

God is great, may His glory shine forth! O Ruler! O Eternal! O First one! O Last one!

We see from the *Tuzuk* (pp. 268, 403, 404) that Khidmat Khán was a eunuch. In the 14th year of Jahángir's reign, he held a command of 550, and 130 horse; and he was present with the emperor, when Mahábat Khán took Jahángir a prisoner.

Khidmat Khán is not to be confounded with Khidmatgár Khán and a Khidmat-parast Khán, two other nobles of Jahángir's reign; nor with the Khidmat Rái (Áin Translation, pp. 252).

5.

At Naglá Jawáhir, in the vicinity of the former office of the Sadr Diwání and Sadr Board of Revenue, Agra, is the tomb and mosque of Mir 'Abdullah Tirmizi (of Tirmiz, on the Oxus), the poet and well-known calligraphist of Jahángir's reign. He received from the emperor the title of *Mishkin-Qalam*, 'the musk-pen'; as poet he is known under the *nom-de-plume* of Waṣfí. His son Muḥammad Ḡálih is also well known as a poet; his assumed name is Kashfí, and two lithographed editions exist of his works.†

Mir 'Abdullah died in 1035, or A. D. 1625-26. The Persian verses on the walls of the largest tomb in the Khusrau Gardens in Alláhábád are by him and were written by him.

The following inscriptions are inside the dome of his Mausoleum at Agra (*metres*, short *Hazaj* and *Muzári*)—

نیم غمگین ازین معنی که میوم * ازین دار فنا سوی جنان رفت
بحمد الله که عرفان کرد حاصل * نه پنداری ز گیتی رایگان رفت
چو تارین و فانش جستم از دل * ازین مانم فغان بر آسمان رفت
دام گفتا بصد درد و بصد آه * ز دنیا ولی قطب زمان رفت

۱۰۳۵

* In the Persian verse the *l* of *dil* is to be doubled *ob metrum*—a rare case.

† Vide also Sprenger, Catalogue, p. 456.

1. I am not sorry that my Mír has left this perishable world for Paradise.
2. Praise be to God that he acquired true knowledge; hence do not believe that he left the world in vain.
3. In searching for the date of his death, the wailing cry of my heart rose up to heaven,
4. And my heart said in sorrow and with many an alas, 'A saint, the pole of the period, has left the world.' A. H. 1035.

شیخ زمانه مظهر انوار جاودان • کز خواجگان چشت یکے نشانه بود
 در بای جود و کان سخا قطب وقت میر • عبداللہ آنکہ در همه فنا یگانہ بود
 کشفی سوال کرد ز تاریخ رحلتش • ہم خود جواب داد کہ شیخ زمانہ بود
 ۱۰۳۵

1. The Shaikh of the age, the focus of the rays of eternity, who is unrivalled among the saints of the Chishti order,
2. The ocean of liberality, the mine of generosity, the pole of the period, is Mír 'A b d u l l a h, who stood unsurpassed in all sciences.
3. K a s h f i [his son] asked for the date of his departure, and answered his own question by saying, "He was the Shaikh of the age." A. H. 1035.

On the outside of the mosque is the following inscription (metre, *Khaffi*)—

کشفیا سر بر سر بن جناب بند • کہ ازین باب کس نشد نومید
 گرد این روضہ روز و شب گردان • چرخ با انجم و مہ و خورشید
 سال اتمام این مکان شریف • ہاتفی گفت روضہ جاوید
 ۱۰۳۵

1. O K a s h f i, place thy head upon His threshold; for none returns hopeless from His door.
2. Day and night, the heavenly sphere with the stars, the moon, and the sun, revolve about this mausoleum.
3. The date of the completion of this noble structure was expressed by a voice from heaven in the words 'the everlasting Mausoleum.' A. H. 1035.

6.

In Mahallah Hathiápol, Agrah, there is a mosque built in 1068 A. H., or 1657-58, by Khán Daurán Nuçrat Khán, the son of Khán Daurán Nuçrat-jang. The father, who at the time of his death was the first noble of Sháhjahán's court, was murdered near Láhor on the 8th Jumáda I, 1055, or 22nd June, 1645, by a Kashmir Bráhma boy, whom Khán Daurán had converted to Islám and put among his servants.

Khán Daurán's name was Khwájah Çábir; he was the son of Khwájah Hiçári Naqshbandi, who held a mançab during Jahángir's reign.

The *Maáşir ul-Umará* has a lengthy biographical note on Khán Daurán, at the end of which the following passage occurs:

"Sháhjahán gave each of his sons more than the will of the father provided, and yet 60 lakhs of rupees escheated to the Imperial treasury, Khán Daurán's ancestors being buried in Gwáliár, he, too, was buried there. Khán Daurán was single-minded and zealous in the service of the emperor, and not avaricious. He devoted three watches of the day and one watch of the night to government. His private affairs were looked after by Mir Sayyid Imámá, who treated the tenants with unusual harshness. On the day when the news of Khán Daurán's death reached Burhánpúr, neither sweetmeats nor sugar were left in the shops; for all people distributed sweets as a thankoffering. Most of the best buildings of Burhánpúr* were erected during Khán Daurán's governorship. Thus Zainábád on the Tapti was built by him; he also erected the saráis between Saronj and Burhánpúr.

His sons Sayyid Muḥammad and Sayyid Mahmúd were made Commanders of One Thousand; and the youngest son, 'Abd ul-Ghaní, though only twelve years old, received a mançab of 500.

The second son, Sayyid Mahmúd, received the title of Nuçrat Khán, and afterwards that of Khán Daurán. In the first year of Aurangzib's reign, he held Allahábád, and was in the second year appointed governor of Orisá, where he died in 1078 [A. D. 1667-68].

It is he who built the mosque in Hathiápol, Agra. Mr. Beale reads one of the two inscriptions† on it as follows (metre, *mutaqárib*)—

بدور شهنشاه شاه جهان * بنا کرد مسجد بفر دوس (؟) سان
خون و جوانمرد فرخنده بخت * پسر خان دوران نصرت خان
چو تاربخ او جست عظم ز طبع * بگفتا بدین جای فیض و ایمان

106A

1. During the reign of the emperor Sháhjahán, the mosque was built..... (?)
2. By the young and noble and fortunate Nuçrat Khán, son of the Khán Daurán.
3. When I searched for its date, Genius promptly said, "In this place dwell grace and security." A. H. 1068 [A. D. 1657-58].

7.

In the same place there is another mosque, which has the following inscription on a marble slab (metre, short *hazaj*)—

* The Central Provinces Gazetteer contains no allusion to Khán Daurán *sub voce* Burhánpúr. *Vide* also article Zainábád. The remark in the Gazetteer (p. 128, l. 11) that Shahnawáz Khán lived the life of a recluse at Burhánpúr is unhistorical; for Shahnawáz died of excessive wine drinking.

† I do not give the second inscription, as Mr. Beale could not obtain a metrical reading.

بدور شاه عالمگیر کز عدل * برفت از دهر کفر و ظلم را نام
چو گشت این مسجد عالی ز کافور * خرد گفتا ضیای عین اسلام

۱۰۸۳

1. During the reign of Sháh 'Alamgír, through whose justice the name of heresy and oppression vanished from the world,

2. This lofty mosque arose through Káfúr, and Genius said, 'The lustre of the eye of Islám.' A. H. 1083 [A. D. 1672-73].

8.

The Aghar Khán Inscription.

The following interesting inscription is engraved on a stone at the head of the tomb of Nawáb Aghar Khán (I.) in Kachpura, Agrah, close to Sarái Khwájah. The tomb was erected by Nawáb Aghar's son, seventeen years after the death of his father.

Aghar is the name of a tribe of Turkmáns,* and Aghar Khán seems to have entered service during Sháhjahán's reign. In the first year of Aurangzib's reign, he accompanied Shaikh Mir and Qaf-shikan Khán who pursued Dará Shikoh to the Indus, and was appointed Faujdár of Bhakkar. Soon after, he served in Bengal and Ásim (Journal, A. S. Society, Bengal, 1872, Pt. I, p. 63). Later, we find him in Kábul, where as Faujdár of Jalálábád he had repeatedly to suppress disturbances (A. H. 1085 and 1086). He especially distinguished himself in a battle fought near Lamghán, where, according to Kháfí Khán, he punished the Afgháns so severely, that he and his Mughul soldiers were feared throughout Kábul, and mothers used to frighten their children with Aghar Khán's name. No less than 1700 heads were sent as trophies to court. The battle of Lamghán itself was celebrated in a poem called the *Agharnámah*. Kháfí Khán gives extracts from the epic (Kháfí Khán, II, p. 244). Near Nang Nihár, Aghar Khán also built a fort, to which he gave the name of Agharábád.

In 1102, or A. D. 1690-91, he was recalled from Kábul, and was killed in the same year by the Játs near Agrah. The inscription, though in several places illegible, gives full particulars, and also shews how insecure the roads then were.

بقاریع سال یک هزار و یکصد و دو از هجرت حضرت علیه الصلوات والتحيات خان
غفران نشان نواب آغر خان از صوبه کابل بموجب فرمان پادشاه ۰۰۰ (؟) هندوستان

* The word *آغر* Aghar is frequently written in MSS. *اغر* without *madd*; and the editors of our Indian histories generally read *اغر*, *A'azz*, instead of *Aghar*. Thus in the Society's edition of the *'Alamgirnámah*. The same work mentions also frequently a villa near Dillí, where Aurangzib often resided, of the name of *A'azzábád* (اعزازآباد). I cannot say whether this, too, is a mistake for *آغرآباد* Agharábád.

روان شده در سرای جاجیو رسید - دو روز پیشتر مردم قافله سحر رفتند - کفار آنجا بغارت برده اسیر کرده بودند - چون همیشه همت عالی بدان غزا مصروف بقویت دین سید المرسلین بود سوار بر نموده دیهات آن کفار را سوخته بسیار کافران را بجهنم فرستاد - اسیران اسلام را خلاص نموده غزا یافته مرتبه شهادت که عالی مدارج است تلاش کرده کام خود را بشهد شهادت شیرین گردانید * و در سال یکمزار و یکصد و نوزده احقر جز و کل دیده مغل که بخطاب موروثی پدر مخاطب گردیده این لوح را برای یادگار بدستخط خود نوشته گذاشت *

تاریخ شهادت ازین ایات حاصل میگردد که میر هویدای بلخی گفته بود اینست چرخ گردون ماند نقش داغ حسرت در میان * حیف ازین دنیای فانی وی دروغا از جهان از برای سید آن شیدا شهید راه حق * لاله داغ ماتم جان در بهار و درخزان (۹) یکطرف سدا شهید شیر دل * رفت و با صد داغ آخر آن شجاع نکته دان سال تاریخ شهیدان را خرد بر ما بگفت * و حروف جیم و ی بیرون شد از باغ جهان بعد شاه عالمگیر پادشاه که شاه عالم پسر کالن او بر تخت هندوستان نشست

کشته شد فقط

In the year 1102 A. H. [A. D. 1690-91], the late Nawáb Aghar Khán left Kábul by order of the emperor for Hindústán. When he arrived at Saráí Jáiyá, he heard that, two days before, a caravan of pilgrims for Makkah had been plundered by the infidels there, who had taken the pilgrims prisoners. As he had always devoted his energy to the strengthening of the faith of the Prince of the Prophets, he mounted, and attacked the villages of the robbers, burning their houses and sending many infidels to hell. He also set the Muhammadan prisoners free. Having thus engaged in a war with infidels, he sought to obtain the highest rank that religion can bestow, and sweetened his palate with the honey of martyrdom.

And in the year 1119 A. H. [A. D. 1707], Dídah Mughul, who is contemptible in every way and had received the same title as his father had, erected this stone as a monument and wrote the inscription with his own hand.

The date of [my father's] martyrdom will be found in the following verses by Mír Huwaidá of Balkh—

1. The revolving heaven put on us the mark of sorrow. Oh, how perishable is life here below! Alas, how miserable is the world!

2. For the sake of the Prophet did this enthusiastic martyr of the road of God,..... [unclear]

3.....[unclear] the lion-hearted and brave leave us behind with hundred of sorrows.

4. Genius told me the date when the martyrs died and said, 'Remove the letters *jím* and be from 'Bágh i Jahán,' 'the garden of Paradise' [= 1107—5, or 1102 A. H.].

He was killed during the reign of Sháh 'Alamgir Pádisháh, whose eldest son, Sháh 'Alam, now sits on the throne of Hindústán.

It is curious that neither the Maásir i 'Alamgirí, nor the Tazkirah i Saláṭin i Chaghtá, mentions Aghar Khán's death; but Kháfi Khán (II, p. 394) gives the following details. 'When Aghar Khán came near

Agra, he heard that some Jāts had attacked a caravan and plundered some waggons in its rear, which they carried off together with the women in them. Aghar Khān pursued them, came upon their fort, set the women free, and sent them off, thus saving the honor of their husbands. But his zeal impelled him to go further, and he surrounded the Garh and besieged it. But he was struck by a bullet, and his son-in-law was also killed. Some time before, Khān Jahān Bahādur Kokultāsh had been ordered to punish the Jāts; and although he did everything in his power in trying to destroy Garhi, Sasani, (?) and other places of these infidels, the result did not correspond to his wishes. Hence his Majesty ordered Prince Muhammad Bedārbakht to root out the Jāts. Khān Jahān Bahādur was sent as governor to Bengal; but before he had reached Bengal, he was deposed and sent to Lāhor, and from there he was sent to other provinces, and was thus kept for three or four years running from one province to another. Wherever he went to, he did not enjoy the income of his jāgīr, and the whole revenue went into the treasury. At last, he was called back to court.

'About this time the order was given [by Aurangzib] that Hindūs without permission should not travel by pālki or ride on Arab or 'Irāqī horses.'

Aghar Khān's son, Mughul Didah,* received the title of his father, and is known as Nawāb Aghar Khān II. He was still alive in 1133 (Khāfī Khān, II, 936.)

9.

The following inscription (metre, *Muzārī*) is taken from the tombstone of one Aghā 'Alī at the foot of the rampart of the Fort of Agra, close to the Amr Singh gate and the stone horse.

دردا که در نبرد شد آغا علی شهید * ساغر ز دست ساقی کوثر کشیده رفت
تاریخ رحلتش چو پرسیدم از خرد * مسکن دوام او بهشت برین بگفت
جمادی الثانی سنه ۱۱۹۹

1. Alas! Aghā 'Alī died a martyr in the fight. The cup fell from the hand of the cupbearer who drew from the nectar of paradise.

2. When I asked for the date of his death, Genius said, 'His mansion is for ever in the highest paradise.' 2nd Jumāda II, 1199. [2nd April, 1785.]

10.

The Walter Reinhardt (Samrú or Sombre) Inscriptions.

The following Quatrain is found on the gate of a garden laid out by the notorious Walter Reinhardt Samrú, in the vicinity of Shāhganj in Agra.

* I. e. either Mughul-eyed, or one who has a 'single' eye, because *mughul* means simple, single-minded.

باغی که ازان چمن چمن گل خودروست * از نکبت آن دماغ عالم خوشبوست
بودیم بفکر سال تاریخ این بنا * عیسی نفسی گفت که باغ سمروست
سنه ۱۷۶۹ ع

1. This is a garden in which many beds of flowers spontaneously grow, and their fragrance perfumes the world.

2. We were thinking of the date when the garden was laid out, when one who had the spirit of Jesus said, 'It is Samrú's garden.' Anno 1769.

Samrú's tomb is in the Roman Catholic Burial ground at Aghrah. The tomb is under a small dome and has the following inscription (metre, long *Ramal*)—

فوت سمرو صاحب آن سرکردۀ نیکو سرشت * سینۀ آفاق را در آتش حسرت برشت
سال تاریخش ز تشریف مسیحا برفلک * باد صبحی گفت از بوی گل باغ بهشت
ع ۱۷۷۸

1. The death of Samrú Sáhí b, the chief of excellent character, burnt the heart of the land in the fire of regret.*

2. A morning zephyr said that the date of his death, counting from the heavenly visit of the Messiah, lies in the words, 'the perfume of the rose of the garden of Paradise.' A. D. 1778.

11.

In the same place inside the dome fixed in the wall is the following :

اینجا مدفونست خواجه مرتدیس لسانی مقدسی که خود را غلام کریستس
میگفت و چون صاحب خیر بود هر چه با خود داشت بذکر آن حضرت بفقرا اینارکرد
در سنه یک هزار و ششصد و یازده از تولد حضرت عیسی *

Here lies Khwájah Martínas, the Armenian, the Christian,† who called himself the servant of Christ. As he was benevolent, he gave all he had to the poor in consequence of a vow made to Christ. A. D. 1611.

12.

Close to the Amr Singh gate and the stone-horse under the rampart of the Aghrah fort stands a tomb built like a tower. The following inscription is on it—

Sacred to the memory of Sitárah Begam, the faithful and affectionate friend and companion of Lieut. Sharp, who died on the 3rd Dec. 1804.

And below it (metre *Mujtasş*)—

قضا ز جام اجل چون ستاره بیگم را * چشاند ذائقۀ کل من علیها فان
جلیل مرتبه لعدت شارب عالیچاه * ازان جویندۀ معشوقه عشق داشت بجان

* Literally, 'roasted the heart of the horizon in the fire of regret.' Mr. Beale's reading has *شمر* Shamrú, not Samrú.

† *Muqaddasí*. Perhaps 'a Christian.'

بسے ز مردنش افسوس خورد و کرد بنا • مناره که بود یادگار از جانان
 بگفت هاتف عیسی نفس پیع تاریخ • ستاره فلك حسن و ناز گشت نهان
 سنه ۱۸۰۴

1. Fate gave Sitárah Begam the cup of death to drink, "of which all who are in this perishable world have to taste" [Qorán].
2. Lieutenant Sharp, of high rank, the distinguished, loved this beautiful beloved from his soul.
3. He was much afflicted by her death, and built a tower in memory of the beloved.
4. A voice from heaven, inspired by the Messiah, said, "The date of her death lies in the words 'The star (sitárah) of beauty's heaven has set.' " A. D. 1804.

13.

Colonel J. Hessing's Tomb.

Col. Hessing's tomb in the Roman Catholic Burial ground, Agra, is of white marble. He died a few months before the capture of Agra by Lord Lake. The following inscription, on a slab of slate, is fixed over the tomb.

Sacred to the memory of
 John William Hessing
 Late Colonel in the service of
 Maharajah Dowlut Rao Sindiah
 Who after sustaining a lingering and very painful illness
 For many years with a true Christian fortitude and resignation
 Departed this life 21st July 1803
 Aged 55 years 11 months and 5 days.
 As a tribute of their affection and regard
 This Monument is erected to his beloved Memory
 By his disconsolate widow Ann Hessing
 And his afflicted sons and daughters, George William Hessing,
 Thomas William Hessing, and Magdalen Sutherland
 He was a Native of Utrecht in Holland
 And came out to Ceylon in the Military Service
 Of the Dutch E. I. Company in the year 1752
 And was present at the taking of Candy by their troops
 Five years afterwards he returned to Holland
 And came out again to India in the year 1765
 And served under the Nizam of the Deccan
 In the year 1784 he entered into the service of Madarow Sindiah
 And was engaged in the several Battles
 That led to the aggrandizement of that Chief,
 And wherein he signalized himself so by his Bravery
 As to gain the esteem and approbation of his employer
 More particularly at the battle of Bhondagown
 Near Agra in the year 1787
 Which took place between this chief

And Nawaub Ishmael Beg
 When he then a Captain was severely wounded
 On the death of Madarow Sindiah in 1793
 He continued under his successor Dowlut Rao Sindiah
 And in 1798 he attained to the Rank of Colonel
 And immediately after to the Command
 Of Fort and City of Agra,
 And which he held to his death.

PHILLIP HUST, *sept. Calcutta.*

Over the entrance is the following *tārīkh* in Persian (metre, *Muḥarrab*)—

جان ولیم هیسنگ چون ز دنیا رحلت نمود بنهاد صد داغ از جدائی
 هلدیز پیدایش آن ولایت در هند نامور شد از فضل کبریائی
 غیب یک قطعه گو ز تاریخ تا روز و سال و مه را یکجا بهم نمائی
 مال و مه را از سال عیسوی چست معلوم بگفت تاریخ بستی یکم جولائی
 سنه ۱۸۰۳

1. When Colonel John William Hessing departed from this world, he left many sorrowing for his absence.
2. By race he was from Holland and was born in that country. In India he became through the kindness of the Almighty famous.
3. The poet asked the inspiring genius of the unseen world to favour him with a *tārīkh*, which was to contain the year, the month, and the day.
4. When he searched for a date according to the Christian era, the inspiring genius said, 'The date is the 21st July [1803].'

14.

Going towards Fathpūr Sīkrī from Agra, we meet on the way, near the village of Suchitia, commonly called Bhondagaon, the mausoleum of one 'Abdurrahmán Sulṭānī, who it appears was killed in Zil-Hijjah, 988 A. H., or January, 1581, A. D., during the reign of Akbar, in a battle fought with the Ráná at Kōḥbhalner.

Nothing else seems to be known of 'Abdurrahmán. I have not found his name in the Akbarnámah. The Persian verses on his tomb, however, are superior to similar productions. There are three poems (metres *Khafīf*, *Mutaqárib*, and *Rubá'ī metre*, respectively), as follows:—

بسم الله الرحمن الرحيم

آه ازین چرخ بیوقا که ازو کار مردم همیشه حیرانیست
 هیچ کس را دله نکرد آباد با همه در مقام ویرانیست
 عبد رحمن هزار پدیده رزم آنکه او را خطاب سلطانیت
 جنگ با کافران غریبی داشت بسکه او را غم مسلمانیت

از قضای زمانه گشت شهید * چاره ندوان چو حکم یزدانیست
 جا بخت و سرای عقده ساخت * زمین سرای که عالم وانیست
 حیف ازان فتح بیکرانگه جود * که چنین زیر خاک پنهانیست
 در غم این یگانگه آفتاب * کار جمعی بصد پیرشانیست
 روز و شب زار زار میگیرند * گرمه سندی و خراسانیست
 گر بقریان شهید شد چه عجب * قوچکار از برای قربانیست
 سال تاریخ ازو چو دل پرسید * آنکه او را سر سخندانیست
 در جواب سوال او گفتیم * عبد رحمان شهید ربانیست

1. Alas, how faithless is fate! It always throws the doings of mankind into confusion.

2. Fate has made the heart of no man happy; with all men it dwells in the place of desolation.

3. 'Abdurrahmán, a lion in war, who had the title of Sultání,

4. Engaged in battle the infidels of the western districts, because he had a heart that feels for Islám.

5. According to the decree of fate, he has now become a martyr; there is no help for it, for it is the will of the Almighty.

6. When he left the caravanserai of this perishable world, he made room for himself in a retired spot of Paradise.

7. Woe to the endless victory of generosity, that such a man should now be hidden by the earth,

8. And that in the loss of this man, who was unrivalled in the world, success should be mingled with so much affliction!

9. If all India and Khurásán weep day and night in sorrow over him, it is no wonder;

10. Nor is it strange that he fell a martyr on the Feast of Sacrifice; for the ram is made to be sacrificed.

11. When my heart asked him for a *tárikh*, him who excels in speech,

12. He gave me as answer to my question the words 'Abdurrahmán is the martyr of God.' A. H. 988.

ز تقدیر حق گشته آخر شهید * ز دنیای فانی بعقباً شده
 ندارد غم این جهان آن شهید * که جایش بقردوس اعلی شده
 خرد بهر تاریخ او این بگفت * چو او را شهادت تمنا شده
 نهان کن ده و دوز محمول او * یکی از شهیدان برعنا شده
 چو باکافران بهردین کرده رزم * نکو نام در دین و دنیا شده
 شده ماه قربان چنین واقعه * شب جمعه این اتفاق شده
 خداوند رحمان برو کرده رحم * که جا در جنازش مهیا شده
 بضاعت نیاورده الا امید * خدایا ز رحمت مکن نا امید

1. Through God's will he became at last a martyr, and left the perishable world for the life to come.
 2. Being a martyr, he does not grieve for this world; for he has obtained a place in the highest paradise.
 3. And because it was his wish to become a martyr, Genius said, "For the sake of a *tárikh*
 4. Take twelve from the words "one of the martyrs* killed by the Ra'ná."
 5. He fought with the infidels for the sake of religion, and thus gained a good name in religion and on earth.
 6. This event took place in the month of the Sacrifice [Zil Híjj], on the night of preceding Friday did it happen.
 7. God in His mercy has been good to him, and a place has been prepared for him in Paradise.
- He brought no stock besides his hopes. O God, in Thy mercy, do not render him hopeless!

آن دل که درین سراچه فانی شد * کاخر نه برون بصددیشیمانی شد
 بس نخل که داد بارجمعیت دل * و ز باد فنا برگ پریشانی شد
 آن غازی نامور که در کنبلذیر * از بهر غزا بحکم یزدانی شد
 هنگام جهاد بسکه دستان نمود * از غایت نام رستم ثانی شد
 نیت چو غزایش بود تاریخ قضا * عبد الرحمن شهید ربانی شد
 زو بسکه بدید تیغ رانی رانا * رانا ز نهیب تیغ او رانی شد
 چون روز ازل سرشته رحمت بود * مستوجب فیض فضل رحمانی شد

طینت چو ز خاک داشت آن گوهر پاک * در زیر زمین چو گوهر گانی شد

1. He was a man whose heart entered this perishable caravanserai, but left it again without feelings of regret.
2. Many a date palm there is that produces pleasant fruit, and yet the wind of destruction scatters its leaves.

* This *tárikh* is unclear.

Instead of Rana (رانا) the verse has رانا, 'a soft and silly woman.' Mr. Beale says that Akbar gave the Ráná of Udaipur this nickname.

Ra'ná occurs also as the name of towns; thus Baqrah is often called 'Al-Ra'ná,' and the Ain i Akbari gives a pargana of the name of Barodah Ra'ná under Sirkár Nárnaul (N. W. of Agrah).

The Ráná alluded to is Ráná Partáb, generally called Ráná Kiká, whom Mán Singh had in 984 defeated in the great battle of Gogandah, N. W. of Udaipur. In 986, Shahbáz Khán Kambú (Ain Translation, p. 400) had wrested Fort Kogbhalmir (or Kogbhalner), north of Gogandah, from the Ráná; and in 988, Shahbáz Khán was again sent to Ajmir. "In consequence of his zeal and activity, Ráná Partáb wandered about on the field of destruction, looking upon every morning as his last day. Many rebels were killed and their property was destroyed; and when the district was cleared, garrisons were distributed over it." *Akbar-námah*, III, 283. Vide also Dowson, V, 419.

3. He was the famous hero, who at Konbalner* waged a religious war by God's order.
4. At the time of the war, inasmuch as he planned stratagems (*dastán*), he became through his fame a second Rustam.†
5. To fight the infidels was his intention, and the date of his death was "Abdurrahmán is the martyr of God." A. H. 988.
6. Indeed, the Ráná experienced through him what sword practice is: the Ráná ran a runaway from the terror of his sword.‡
7. When in the beginning the fate of men was settled, God's mercy fell to his share, and he received the blessing of God's favor.
8. But as his body was of earth, his pure frame lies now below the ground, like the jewel of the mine.

15.

A rather poetical inscription in Tughrá is found on a tombstone in the old Burial-Ground, Agrah. One Abul Fattáh, son of Bábari Sultán, died on the 13th Shawwál, 978 (A. D. 1571). The people of Agrah say that Abul Fattáh was the son of Akbar's father-in-law (?). A rubbing of the inscription was received in 1871 from Mr. A. Carleyle (Proc., A. S. Bengal, June, 1871, p. 127).

The words of the inscription are the words of the sorrowing father (metre, *Rubá'í*)—

ای شمع دو دیدی جهان افروزم * رفتی وز فرقت تو شب شد روزم
گویا دو شمع بهم من و تو بودیم * گایام ترا بکشت و من میسوزم
کاتب عبد الهادی

بنارنج سیزدهم ماه شوال سنه نهصد و هفتاد و هشت مردومی مغفوری ابو الفتح
بن بابری سلطان در آغاز جوانی ازین عالم فانی برحمت حق پیوست *

1. Light of my eyes! Thou once didst brighten the world.
Thou art gone, and in thy absence my day has turned into night.
2. We were once as if two lights, when I and thou were together;
But Fate has extinguished thine, and I now burn in sorrow.

Written by 'Abdul Hádí. On the 13th Shawwál, 978, Abul Fattáh, son of Bábari Sultán, now received in God's mercy and pardoned, left in the beginning of his youth this perishable world, in order to join the mercy seat of God.

* Mr. Beale gives کنبلنر and says that he was doubtful what the word was. I have substituted کنبلنر *Konbalner*.

† An allusion to *Dastán*, the wily father of Rustam.

‡ I have tried to imitate the alliteration in the text.

* Fathpur Si'kri'.

The village of Si'kri was called Fathpūr by Akbar in memory of his conquest of Gujarrāt.

1.

The High Gate, or 'Baland Darwāzah,' in front of Akbar's Masjid at Fathpūr Sikri was built in 983 A. H., or A. D. 1575, as appears from the tārikh (metre, *Mutaqārib*)—

شده رشك طاق سپهر بلند

It rivals the portico of the high heaven.

It bears the following Arabic and Persian inscription—

قال عيسى عليه السلام الدنيا قنطرة فاعبروها ولا تعمروها - فى الاخبار من تأمل
انه يعيش غدا تأمل انه يعيش ابدًا - وقيل الدنيا ساعة فاجعلها طاعة - بقية العمر
لا قيمة لها - فى الاخبار من قام الى الصلوة وليس معه قلبه فانه لا يزيد من الله
الا بعدا - خير المال ما انفق في سبيل الله - بيع الدنيا بالآخرة يربح - الفقير ملك فيها
محاسبة ۱۱

نامي چه شد ارتو مسجد گاهي كودي * در قصر زر اندوده پناهي كودي
خويي جهان بصورت آينه دان * خود گيرو توهم درو گاهي كودي
قايله و كاتبه محمد معصوم نامي بن سيد صفاي القرمزي اصلا و البكري سكنا
و المنتسب الى سيد شير قلندرين بابا حسن ابدال السبزواري مولدا و
القندهاري مولدا *

Jesus,—upon whom be peace!—said, 'The world is a bridge; pass over it and do not cultivate it.' It is written in the Hadīṣ, 'He who thinks that he will live to-morrow, may as well think that he will live for ever.' The world is called a moment; therefore make it an act of worship. The remainder of one's life has no value. It is also said in the Hadīṣ, 'He who comes to prayer and his heart is not with him, will only increase his distance from God.' 'The best property is what is spent on the road of God.' Selling the world for the life to come is profitable. Poverty is a realm in which there is God's reward.

1. Nā m f, how would it be, if thou didst make a place of worship, and if thou didst take refuge in the gilded castle [of Paradise].

2. Look upon the beauty of the world as upon a looking-glass: take it up, and thou, too, hast taken a glance at it.

The composer and writer of this inscription is Muḥammad Ma'qūm, whose *nom-de-plume* is Nāmī, the son of Sayyid Qaṣīf of Tirmiz and subsequently of Bhakkar, who traces his descent from Sayyid Sher Qalandar, son of Bābā Ḥasan Aḥdāl, who was born at Sabzwār and lived at Qandahār.*

* This inscription is also given in Sayyid Ahmad's edition of the *Tuzuk i Jahāngirī*, Preface, p. 3, note; but there it is mixed up with one of the following inscriptions.

A biographical notice of Mir Ma'ǧūm Nāni will be found in my *Xin Translation*, pp. 514, 515.

2.

In 1008 A. H., when Akbar left for the Dak'hin and arrived at Ujjain, he ordered the following inscription to be put up on an old building there. The inscription is by the same poet as the preceding—

بقاریع سنه ۴۴ الهی موافق سنه ۱۰۰۸ هجری رایات ظفر را بعزم تسخیر دکن
بایغیا عبور افتاد
نامی ز فلک دوش دلم کرده سوال * کز رفته و آینده بیان کن احوال
گفتا چه خبر ز رفتگان نیست اثر * آینده جو رفته زن چه می پرسی حال

In the 44th year of the Divine Era, or 1008 A. H. [A. D. 1599-1600], the victorious army passed this place on its way to the Dak'hin.

1. O Nāni, last night my heart asked fate to explain the circumstances of the past and of the future.

2. Fate answered, 'Information regarding those who have past away has no trace, and the future is like the past. What canst thou know regarding it?'

When after the conquest of the Dak'hin, Akbar returned, in 1010, to Fathpūr Sikrī, he ordered the following inscription to be put on the other side of the 'Baland Darwāzah'—

حضرت شاهنشاه فلک بارگاه ظل الله جلال الدین محمد اکبر پادشاه فتح ملک
دکن و داندیس که سابقا مسمی به خاندیس بود نمود و در سنه ۴۶ الهی موافق
سنه ۱۰۱۰ بفتح پور رسید به عزیمت آگره فرمود
تا نام زمین و آسمان است * تا نقش وجود در جهان است
نامش بسپهر همنشین باد * ذاتش بجهان ابدقرین باد

His Majesty whose throne is high as the heaven, the shadow of God, J a l ā l u d d ī n M u h a m m a d A k b a r S h ā h, conquered the kingdoms of the Dak'hin and of Dān-desh, formerly called Khāndesh, and arrived on the 46th year of the Divine Era, or 1010, in Fathpūr, in order to go to Agra.

1. As long as the names of heaven and of earth remain, and as long as Existence is found in the world,

2. May his [Akbar's] name be lofty as the heaven, and may his spirit be forever in the world.

Khāndesh was called Dāndesh in honor of Prince Dānyāl, Akbar's third son.

Both Mr. Beale and Sayyid Ahmad give the word *filhā* instead of *filhū*. Sayyid Ahmad says that Sikrī was called Fathpūr in memory of Akbar's conquest of the Dak'hin; but this is wrong.

3.

Akbar's 'Khawábgháh,' or sleeping apartment, in Fathpúr Sikri contains the following Persian verses (metre, *long ramal*)—

قصر شاهی ست بهر باب به از خلد برین * سخنی نیست درین باب که خلدیست برین
غرفه شاه نشیمن خوش و مطبوع و بلند * کرده در قطع او جنت اعلیٰ تضمین
فرش ایوان ترا آینه سازد رضوان * خاک درگاه ترا سوره کند دور العین
چون فلک هر که کند سجده خاک در تو * شود از خامیت خاک درت زهره جبین

1. The imperial palace is in every way better than the highest paradise; at least, there is no doubt that it is the highest paradise.

2. The room of the emperor is beautiful, pleasant, and lofty, and comprises in its structure the highest paradise.

3. Rizwán, the keeper of paradise, makes the carpets of thy castle (smooth like) looking-glasses; and the *Hár ul-'ín* (the 'Houris') make the dust of thy palace like *sar-mah* (which is beneficial to the eyes).

4. Whoever, like the heaven, worships the dust of thy threshold, obtains through the virtue of the dust a Venus-like forehead.

Fíru'za'ba'd, east of A'grah.

Firúzábád lies about 25 miles east of A'grah. Elliot in his Glossary (Beames, II, p. 89) says it was built by Firúz Khán, a nobleman of the reign of the Sháhjahán. The nobleman alluded to is called Fí r ú z K h á n or Fí r ú z K h w á j a h; he was one of Jahángír's eunuchs. At Jahángír's death, he delivered Prince Shahryár into Dáwar Bakhsh's hands.* His tomb is of white marble, and stands at the side of the road from Firúzábád to A'grah; but the inscription on it only contains verses from the Qorán.

Near Firúzábád is a tomb and a small mosque adjoining it. The tomb covers the remains of 'Iwaz Beg Khán Bahádúr Hizabr-jang, who died on Sunday, 13th Rabi' I, 1189 [14th May, 1775]. The following inscription is on it (metre, *Khafif*)—

ای دریغا که فصل دی آمد * حیف صد حیف رفت فروردین
رو بخشکی نهاد سبز تو * ریخت بر خاک رونق نسوین
مرد آقا بزرگ پاک نژاد * رفت روحش بعرش علیین
بر سر قبر آن فرشته خصال * فائده خوان همیشه روح امین
تربتش را کند مگس رانی * هر دم از زلف خویش دور العین
ساخت آقا رحیم روضه او * دادش از خانه خدا توئین
سال تاریخ فوت آن مغفور * فکر فایز که بود در پی این
ناگهان هائقی کشید الف * گفت از فوط غم بصوت حزین

* Vide Calcutta Review for October, 1869, 'Death of Jahángír.'

لفظ مستعمل بهشت نصیب * تو به آقا بزرگ ساز قورین

عوض بیگ خان بهادر دُزبُرجنگ روز یکشنبه سیزدهم ماه ربیع الاول سنه ۱۱۸۹

وفات یافت *

1. Alas, the chilly season has come! A hundred woes to spring departed!
 2. The fresh green has turned sere and yellow, and the pride of the rose lies scattered on the ground.
 3. The great Āghá is dead, whose descent was noble, and his spirit has fled to the heavens on high.
 4. O Gabriel, read forever a *Fātikah* at the headstone of this angelic man.
 5. The Houri of paradise waft with their curls fresh breezes to his tomb.
 6. The merciful Lord himself built his mausoleum, and made it more splendid than the temple of God [in Makkah].
 7. The date of the death of this pardoned man was expressed by the thoughtful poet Fāiz (who tried to find one,
 8. While a voice from heaven heaved a sigh, in excessive sorrow and with plaintive voice), by the word
 9. 'Bihisht-naqib' [one to whose lot Paradise has fallen], to which you are to add 'Āghá Buzurg,' 'the great Āghá.'
- 'Iwaz Beg Khán Bahádur Hizabr-jang died on Sunday, 13th Rabi' I, 1189. A. H.

To Parganah Firúzábád belongs the village of Qúfipúr, so called after a Muhammadan Saint of the name of Sháh Qúfi,* whose shrine is there. He seems to have lived at the time of 'Aláuddin. Mr. Beale has sent a copy of the following letter from Mr. Mansel, Collector of Agrab, to the Commissioner of Revenue at Agrab, dated 29th May, 1839, regarding the shrine of Sháh Qúfi.

"It is related by the Khádims of the dargáh, that in the reign of the emperor Akbar, Shah Súfi, a fakcer of some celebrity, wandered from Īsfahan to India, and took up his hermitage among the Jamuna ravines near the city of Chandwár, then the country town of the Parganah of the same name, and which from the remains which still cover the surrounding country for miles—ruined mosques, dilapidated octagon mausolea, fallen entrance-gates and such like works of costly strength,—must have been an important post in a fiscal and military point of view. At the time from which the fables of Shah Sufi's miracles commence, Raja Chandersen was the lord of the fort of Chandwár, and a troublesome tributary of the Delhi court. Non-compliance with the royal demands for payment of revenue brought upon the Raja the investment of his fort by the army of Akbar, who is said to have commanded his forces in person and to have prosecuted his attack with no approach to success for a period which the credulous or imposing Khádims of the establishment have exalted to a term of ten years. In the language

of oriental metaphor, the emperor is said to have planted a mangoe tree on the commencement of the siege, and to have eaten the fruit of it ere his success was secured. This success was owed to the anchorite of the ravine, Shah Sufi. During a severe land storm, the lamps of the entire camp were put out, and the lights of the Shah's hut alone glimmered in the surrounding darkness.* This extraordinary fact led to the Shah's being visited by some of the courtiers. The miraculous character of the event being much commented on by the visitors, the Shah acknowledged himself to be under the special favour of Heaven, and in the end, the conversation turned upon the difficulties of the siege, and the grateful sense of the hermit's interference which the sovereign would entertain in the event of its being brought to a close by his holy means. The Shah promised the required aid, and declared that the fort should be captured by a fixed day. Thus much for the emperor. In respect to the Raja, the Shah acted very effectually upon his superstitious fears, told him that the fort was destined to fall, and proffered his own miraculous powers to secure for the Raja a safe and honorable retreat for himself, his family, and valuables. The whole were accordingly passed invisible through the besieging camp, and the Raja quitted Hindustan for the eastward. In return for this valuable service, the emperor bestowed half of an hamlet of Chandwár on the Shah. The place assumed the name of Sufipur, and has since been inhabited by the descendants of the Shah. The decease of Shah Sufi took place soon after the grant was made, and he was buried on the brow of a deep ravine, a handsome tomb being erected over his remains. The mausoleum is still in good order and forms a picturesque object in the midst of the desolation of the Jamuna ravines in the vicinity of Chandwár and Firozabad. Its pretty dome and minarets, commanding, as they do, the heights of the Jamuna ravines, often lead the voyagers on the river to visit the shrine of the saint, and landwards the building is an object of interest and beauty, which all would regret to see lost to the country. There are several *dáláns*, a handsome gate, and a small mosque comprised within the building, and the whole is kept in occasional good repairs by the outlay of part of the funds of the grant. The fable of the whole is palpable. Indeed, the Raja, who under the name of Chandersen was ousted from Chandwár, lived in the reign of Aláuddin†, and his descendants were the party who fell under the displeasure of Akbar."

* I cannot say whether this is the Sháh 'Súfi Yahyá,' mentioned by Mr. F. S. Growse in his *Memoir of Mathura District*, Vol. I, p. 148.

The same miracle will be found in Ibrahim Bayyá's story, *Journal, A. S. Bengal*, 1873, Pt. I, p. 300.

† South of the Dargáh lies a village of the name of 'Aláuddinpúr.

Gwáliár.

The Jāmi' Mosque in Gwáliár,* which was built by Mu'tamid Khān, an officer of Aurangzib's court, in 1074 A. H., or 1663-64, bears two inscriptions, one inside and one over the gateway.

Mu'tamid Khān's original name was Khwājah Nūr. He was a eunuch, and received soon after Aurangzib's accession the title of Mu'tamid Khān ('the trustworthy'). In the second year, he was made a commander of 1000, and 300 horse, and Commandant of Agra, and was put in charge of the Imperial harem.

On the 24th Jumāda I, 1071, he was made Commandant of Gwáliár where Sulaimān Shikoh, Prince Muḥammad Sultān, Prince Murād Bakhsh and his son I'zid Bakhsh, were confined. In Gwáliár he remained till 13th Rajab, 1078, when Khwājah Phul was appointed Commandant of the fort. In 1081 and 1085, we find Mu'tamid Khān again commanding Fort Agra. In 1091, Mu'tamid Khān's property, consisting of 12½ lakhs of rupees, besides jewels and cattle, was sent from Gwáliár to Court, but the *Ma'isir-i-'Alamgiri* says nothing regarding the cause of this confiscation. In 1099, Mu'tamid Khān was appointed Dāroghah i Dāgh o Taḥṣihah, or head of the musters and the recruiting department. He died in 1101 A. H., or A. D. 1689-90.

The Gwáliár Jāmi' Mosque was therefore built by him when commanding the fort.

در زمان شاه عالمگیر آنکه * برده فیض از لطف عامش بر فریق
آن شهنشاه که پیش جود او * بحر در آب خجالت شد غریق
معمد خان مصدر نور یقین * شد ز فضل حق چو توفیقش رفیق
کرد بر پله مسجد عالی اساس * زو طلب کن وصفش از فکر دقیق
سال تاریخی بدایش خواستیم * پیور دانش گفت کا لبیت العقیق

۱۰۷۱

1. In the time of Shāh 'Alamgīr, who has

2. A king, before whose generosity the ocean feels ashamed,†

3. Mu'tamid Khān, in whom the true light‡ of faith appears, found through God's kindness grace.

* Whether this Jāmi' Mosque is the same as the Jāmi' Mosque of Gwáliár mentioned by General Cunningham (Arch. Report, Vol. II, p. 370), I cannot say. But if they are the same, Sir W. Sleeman's historical particulars quoted by General Cunningham are not correct. General Cunningham gives several interesting particulars regarding Mu'tamid Khān; *vide loc. cit.*, pp. 333, 371.

† In spite of the numerous pearls which the ocean possesses.

‡ In allusion to his name Khwājah Nūr (i. e. light).

4. To build a lofty mosque. Ask him minutely regarding its excellence.
 5. I searched for the date of its construction, and the old sage told me the words
 "Like a house of agate." A. H. 1074.

• در اوان شاه عالمگیر عادل دین پناه •
 • کز فروغ عدل او عالم پذیرفته ضیا •
 • معتمد خان یافت چون توفیق حـق با خود رفیق •
 • ساخت این مسجد مقدس را ز صدق دل بنا •
 • حاصل این چاه و این حمام هم این حجره ها •
 • وقف شد بر خدمت مسجد پیع نان و نوا •
 • خواهـم از شاهان و از حـکم عادل روزگار •
 • تا نیا لایند دست از حاکمـش بهر خدا •
 • باد دایـم یا رب این مسجد بفضل اهل دهر •
 • تا بود گیتی و مهر و ماه و هم ارض و سما •

1. In the reign of Sháh 'Alamgír, the just, the religious, the light of whose justice illuminates the world,
2. Mu'tamid Khán found grace to build with sincerity of heart this holy mosque.
3. The revenue of this well and this bath and these rooms was given as a perpetual grant to the servants of the mosque for their maintenance.
4. I request the just kings and rulers of the age not to misappropriate the revenues of the mosque for the sake of God.
5. O God, may this mosque through the kindness of the people of the world remain standing as long as the world, the sun, the moon, the earth, and the heaven remain !

Mr. J. Wood-Mason exhibited drawings of various Blind Crustaceans and drew attention to the fact that a species differing in no particular of generic value from *Deidamia leptodaetyla et crucifer* of Willemoës v. Suhm, discovered by H. M. S. 'Challenger,' had, years before, been described by Prof. C. Heller under the name of *Polycheles typhlops*; in which species from the Mediterranean the organs of vision were also morphologically entirely wanting, being merely represented by two minute pigment-specks situated at the usual place of origin of the eye-stalks. Mr. Mason also stated that *Polycheles typhlops* and its allies could be placed in no existing family of crustaceans, recent or fossil, with the exception perhaps of the *Eryonidæ*, the structural characters of which appeared to be far too imperfectly known to warrant their being included in it; he, therefore, proposed to establish a new family, to be called the *Polychelidæ*, for their reception, and provisionally to consider them as members of its single genus *Polycheles*. Mr. Mason

further stated that the *Astacus Zalcucus* of Willemoës v. Suhl was no Astacid at all, but represented a new and very remarkable genus of *Thalassinidae*, which he proposed to designate *Thaumastocheles*: in this species, particularly, the caudal 'swimmeret' had not the terminal plate of its outer branch transversely jointed as in all true *Astacidae*; he was glad to find that M. Alph. Milne-Edwards, the eminent carcinologist of France, had expressed a similar opinion with regard to its systematic position, in a "Note on the *Nephropsis Stewarti* of Wood-Mas.," published in the last number of the 'Annales des Sciences Naturelles.'

Mr. Wood-Mason also exhibited specimens of *Trictenotoma Childrenii*, Gray, and read the following note thereon.

Note on Trictenotoma Childrenii, Gray.

So far as I have been able to discover, one additional species only of the very anomalous family of coleopterous insects, *Trictenotomidae*, of which *T. Childrenii*, Gray is the type, has been described since Professor Westwood published in his 'Cabinet of Oriental Entomology'* the results of his dissections of the three species known to him, viz., of *T. Childrenii*, Gray, *T. Templetonii*, Westw., and *T. aenea*, Parry. Of the first-named I have recently received two specimens (♀) collected at Sámagúting, in the Nágá Hills, by Captain J. Butler, a third (♀) captured by Major H. H. Godwin-Austen in the Dhansiri Valley, and a fourth (♂) taken by one of the collectors of the Indian Museum at Johore, in the Malay Peninsula.

This species having been incorrectly described by Dupont,† whose specimen had most likely become stained by the exudation of fatty matters from the body of the insect itself, after death, or by prolonged immersion in alcohol in company with other objects, as "couverte en dessous d'un villosité jaune verdâtre," it may be worth while to correct the mistake.

The whole of the ventral surface of the insect, in both sexes, from the extremity of the abdomen to the very tips of the triangular processes that lie in front of the eyes and bound the labium (*mentum* of Westwood), the femora to their distal ends, and the narrow inflected portions of the elytra are clothed with a most delicately pure ashy-grey pubescence, wanting only on the mesosternal process, which appears to be normally shining-black, and on the middle of the posterior margins of the abdominal segments, from which it has been removed by friction; the pubescence on the labium and the fringe of hairs on the fore margin of the prosternum alone being stained with very pale luteous; the anterior and posterior faces of the tibiae, especially of the two anterior pairs, are also slightly pubescent.

The distribution of the four described species is as follows:—

T. Childrenii. Hab. Assam; Tennaserim coast; Johore; Java.

* Op. Cit., p. 47, Pl. XXIII.

† Mag. de Zool., pl. 35, 1832.

T. Templetonii. Hab. Ceylon.

T. anca. Hab. Himalayas.

T. Grayii. Hab. Canara, Malabar Coast.

The President announced that the Council propose to commemorate the services of their late Natural History Secretary, Dr. Stoliczka, by a suitable memorial, and had appointed a Committee to ascertain in what way the proposal could best be carried out. A circular on the subject would be issued in due course.

The following papers were read—

1. *Note on a Picture representing the taking of Palámau by Dáúd Khán, Aurangzib's General.*—By COL. E. T. DALTON, C. S. I.

Col. Dalton gives in this note a description of a picture representing the taking of Palámau, in Chutiá Nágpár, by Dáúd Khán, Aurangzib's general.

The picture, which is in the possession of Dáúd Khán's descendants at Dáúdnagar, is on cloth and is about 30 feet by 12 feet. It represents the several stages of the fight which led to the capture of Fort Palámau on the 20th December, 1660, as related in *Journal*, for 1871, Part I, p. 127. Col. Dalton's note is accompanied by a photograph of the picture, taken by Mr. Peppé, a plan of the picture, and two photographs of Fort Palámau itself. The costume of the officers and soldiers as also the ethnic peculiarities of the hillmen and their arms are remarked on (*vide loc. cit.*, p. 132).

The paper will appear in No. III of the *Journal*, for this year.

2. *Note on Fort Ekdáláh near Panduah, Máldah District.*—By E. V. WESTMACOTT, Esq., C. S.

Mr. Westmacott fixes in this paper the position of Fort Ekdáláh, which was twice in vain besieged by Firúz Sháh III, of Dihlí, when invading Bengal during the reigns of Ilyás Sháh and Sikandar Sháh.

Fort Ekdáláh lies N. N. E. of Máldah, about Lat. $25^{\circ} 27'$, a little east of the Chirámatí, and is marked on the 1-inch-a-mile survey map. It is not given on Sheet 119 of the Indian Atlas; but the three large tanks near which Ekdáláh lies, are prominently marked.

Mr. Westmacott's paper will be printed in No. III of the *Journal*, Part I, for this year, and will be accompanied by a map.

Mr. Blochmann said, there was no doubt that Mr. Westmacott had now fixed upon the true site of Fort Ekdáláh. Besides the proofs adduced by him, there was some collateral evidence. Thus the places near Ekdáláh were Qaqbah (marked 'Kasba' on Sheet 119), or the 'collectorate,' and Dhánjar itself, after which the parganah, to which Ekdáláh belonged, was

called: and N. W. of it, on the Chirāmaṭi, lay Paikpārā, the place, no doubt, where the Bengal Paiks were stationed.

3. *Contributions towards a knowledge of the Burmese Flora, Part I.—*

By S. KURZ, Esq.

This paper will be published in the forthcoming number of the Journal.

4. *Descriptions of nine species of Alycaïnae from Asām and the Nāga Hills.—By MAJOR H. H. GODWIN-AUSTEN, F. G. S., F. Z. S.*

This paper will be published in the Journal Part II.

5. *Note on the Composition of the Calcutta Coal-Gas.—By ALEXANDER PEDLER, F. C. S., Fellow. Chem. Soc., Berlin.*

The bad quality of the gas supplied to Calcutta is the subject of very frequent remark, and judging from the amount of light furnished by most of the public gas lamps, it would be by no means an unfounded one. There is however, no doubt that the burners supplied to these lamps are so badly constructed, that they are not capable of giving anything like the maximum amount of light which should be produced by the gas. The returns of the official Gas Examiner for the past year, shew that the average illuminating power of the gas, when burnt at the rate of 5 cubic-feet per hour from a standard argand burner, equalled the light of 13 sperm candles burning 120 grains per hour; and he has also shewn that the generality of the street gas-lamps do not give a light equal to more than seven or eight candles. It would be obviously unfair then to condemn the gas because of the badness of the light of the street lamps.

A coal-gas which only gives a light equal to thirteen candles is, however, of very poor quality, for very few large towns are satisfied with a gas giving less than sixteen candles, the minimum now allowed in London. There is no doubt that the large quantity of ammonia which is present in the gas of Calcutta, and which has averaged during the past year 37.5 grains per 100 cubic feet, must deteriorate its illuminating power to some extent, and there is also no doubt that this is the cause of the excessive fouling of the gas-pipes, fittings &c., which is a frequent source of annoyance, and which may also produce a further decrease in the illuminating power of the gas.

Judging, however, from the composition of the various samples of Indian coals, such as are obtained from Sanktoria, Dumarkanda, Rāniganj, Banālī and Mangalpur, the analyses of which have been published by the Geological Survey, there did not appear to be any reason, why illuminating gas of a very fair quality should not be obtained from them, if properly treated. It appeared to me to be very probable that the low illuminating

power of the gas was due either to the presence of a considerable amount of impurity, or to an imperfect manufacture of the gas. So far as I am aware, the composition of the gas supplied to Calcutta has never been ascertained, and it appeared to me that it would be interesting to determine its exact chemical composition, so as to judge of the cause of its bad quality. For this purpose, I have made a series of analyses, the results of which are appended in the table on the opposite page. In the first four columns of the table will be found four analyses of the gas supplied on various days to Calcutta, and in the fifth column, is given the average composition of the Calcutta gas as deduced from twelve analyses. For the purposes of comparison, I have introduced into the table the analyses of two samples of London gas, and one sample of Manchester gas, the latter being of good quality, the two former only fair in quality.

The illuminating power of any sample of coal-gas depends upon the amount of the illuminating hydrocarbons (belonging to the $C_n H_{2n}$ series) which it contains, and, to a great extent, on the proportion of carbon contained by these hydrocarbons, as shewn by the amount of carbonic acid generated by them. A glance at the table will shew that in luminiferous constituents the Calcutta coal-gas is tolerably rich, and yet we have already seen that the illuminating power is in fact less than that of London gas, which contains a much smaller proportion of hydrocarbons; it therefore at once becomes evident that the loss of light must be due to the presence of some impurities.

The chemical composition of the gas shews that there are both imperfections in its manufacture and in its purification. In the first place, we have no less than 4.79 per cent. of carbonic acid present in the gas; this, as is well known, is an impurity most destructive to the illuminating power; it has been shewn that for every 2 per cent. of this substance present the illuminating power of coal-gas is diminished to the extent of from one candle to one and a half candles; that is to say, if this impurity were removed (which is a very simple matter) the illuminating power of the gas would be increased from thirteen candles to about fifteen or sixteen candles. The second point that I have to draw attention to, is the *extremely* large amount of nitrogen present; this can only arise from imperfections in the manufacture; it means to say, that about 15 per cent. of the gas supplied as coal-gas, has been drawn in from the air during the process of manufacture, and it shews that either the retorts are in a very dilapidated condition, or that sufficient care is not taken to keep the retorts properly closed, when the gas is being formed. The presence of the nitrogen in the gas is decidedly detrimental to its illuminating power, but even supposing that it has simply a diluting effect, and no injurious action on the gas, the absence of the nitrogen would raise the illuminating power from 13 to 15.3 candles. It has, however, been shewn by the experiments of

	Calcutta Gas				Average composition of 12 samples Calcutta Gas.	London Gas.		Manchester Corporation Gas.	Calcutta Gas.		
	April 28	July 10th	July 16th	July 20th		*Great Central Co.	Chartered Co.		July 24th, 1874.		
	8-15 P. M.	8-55 P. M.	12 P. M.	11-40 P. M.					7-30 P. M.	8-15 P. M.	11-45 P. M.
Illuminating Hydrocarbons (of $C_n H_{2n}$ series,)	5.78	6.47	5.99	6.24	6.32	3.56	3.53	10.81	6.16	6.30	6.51
Marsh Gas,	36.46	44.99	37.56	44.66	40.35	35.28	35.26	41.99	40.71	41.88	43.41
Hydrogen,	32.16	24.31	29.32	20.17	25.64	51.24	51.80	35.94	24.73	26.55	25.05
Carbonic Oxide,	3.34	3.70	8.49	5.32	7.53	7.40	8.95	10.07	6.53	5.37	5.33
Carbonic Acid,	4.53	4.94	4.48	4.90	4.79	0.28	0.00	1.19	4.91	4.61	4.40
Oxygen,	0.99	0.69	0.88	0.37	0.60	0.44	0.08	traces	0.35	0.43	0.50
Nitrogen,	11.74	14.90	13.28	18.34	14.66	1.80	0.38	traces	16.61	14.86	14.80
	100.00	100.00	100.00	100.00	99.89	100.00	100.00	100.00	100.00	100.00	100.00
Amount of Carbonic Acid generated by 1 volume of the illuminating Hydrocarbons, ...	...	...	...	...	2.3	4.0	4.0 about	2.8			
Illuminating power of gas when burned at the rate of 5 cubic feet per hour, equal to standard sperm candles,	...	...	...	...	13	16 (about)	16 (about)	22.1			

Silliman and Wurtz² that by the admixture of such gases as oxygen and nitrogen with coal-gas, its illuminating power is destroyed very rapidly.

Thus in the case of air, for every one per cent. added to coal-gas, there is a loss of rather more than one-half a candle power. No doubt a considerable part of the loss is due to the oxygen present in the air, but there is also a considerable part due to the presence of the nitrogen; I have little doubt that in the case before us, there is a loss of from 3 to 4 candles in the illuminating power of the gas, due to the presence of the nitrogen. I have also made some series of analyses on the gas supplied at different hours of the same night, but have found that practically it has nearly the same composition at whatever time it is collected. A series of three analyses of gas collected at different times on the same evening is given in the three last columns of the table.

I have not attempted to make many determinations of the other impurities present in the gas, that is to say, the amounts of Sulphur and Ammonia, as they are regularly determined by the Gas Examiner to the Municipality. There is, however, no reason whatever why the Calcutta gas should not be as free from these substances as any other gas-supply. As already stated, the quantity of Ammonia present in the gas is enormous, and it is a sign of the most imperfect purification. There is no difficulty in removing the whole of this impurity, and the quantity present is at least fifteen times as much as the maximum quantity that ought to be present. The quantity of Sulphur on the other hand is not so large as might be expected, but this arises probably not so much from the very complete purification of the gas, as from the fact that Indian coals on the whole do not contain a very large proportion of sulphur. I hope, however, at some future time to return to these two impurities.

To sum up the result of these experiments, it may be said that it is probable, if care were taken during the manufacture of the gas to exclude the nitrogen (which must come in from the air), and also if the carbonic acid present in the gas were removed, that the illuminating power of the Calcutta gas instead of being only 13 candles, would be increased to about 17 or 18 candles. The greater part of the carbonic acid present in the gas is due to the air drawn in during the process of manufacture, the oxygen of which combines with the red-hot coke or carbon forming Carbonic acid. The quantity of air which is thus drawn in amounts to about 17 per cent. and is the cause of the two impurities nitrogen and carbonic acid.

² American Journ. Science and Arts [2] XLVIII, p. 49.

6. *Notes on the Bárah Bhúyas of Eastern Bengal.*—By DR. J. WISE.

Dr. Wise gives in this paper the family histories of five of the twelve Bhúyas of Bengal, after whom Bengal is often called "*Bárah Bhúya Mulk*." The word "*Bhúya*" means the same as *Bhúmik* or *Zamíndár*, and does not indicate ethnic differences, as understood by Buchanan, Col. Dalton, and the compiler of the last census report. In modern times even the title of *Bhúya* was frequently conferred, on payment of a fee, by the *Rájás* of *Kachhár*.

The five *Bhúyas* of Eastern Bengal noticed in this paper are the *Ghází* family of *Bhowál*; the family of '*Isá Khán*, whose descendants are the *Diwán Sábibs* of *Jangalbári*; and the *Hindú zamíndárs* of *Bhaluah*, *Chandradíp* (*Baklá*), and *Bikrampúr*.

The paper is accompanied by a photograph taken by Mr. Cadell of the large *Shiv* temple near the site of the old town of *Sripúr* (*Bikrampúr*), now surrounded by dense jungle. The temple is the highest in eastern, if not in the whole of, Bengal.

The reading of the following paper was postponed—

The *Ismáíl Ghází Legend*, according to a Persian History discovered at *Rangpúr*.—By G. K. Damant, Esq., C. S.

LIBRARY.

The following additions have been made to the Library since the meeting held in July last.

Presentations.

* * * Names of Donors in Capitals.

Journal of the East Indian Association, London, Vol. VIII, No. I.

P. M. Tuft.—*Anglo-Indian Vital Statistics*.

THE ASSOCIATION.

Bulletin de la Société de Géographie, Paris, Avril 1874.

Garnier.—*Divisions civiles du territoire britannique en Birmanie*. *Col. Yule*.—Note pour MM. Fau et Moreau, voyageurs en Birmanie (Extrait d'une lettre au Secrétaire général).

THE SOCIETY.

Actes de L'Académie Nationale des Sciences, Belles-Lettres et Arts de Bordeaux, 3^e Série, 1872, 3^e et 4^e trimestres.

THE ACADEMY.

Journal of the Ceylon Branch of the Royal Asiatic Society, 1874, Part I.

W. Ferguson.—Description of a supposed new genus of Ceylon Batrachians. *Louis de Zoysa*.—Notes on the identity of *Piyadasi* and *Asoka*. *W. F. Legge*.—On the Island distribution of the Birds in the Society's Museum. *S. Bligh*.—Notes on the occurrence of a rare Eagle new to Ceylon; and other interesting or rare birds. *R. Van Cuylenberg*.—

Extracts from the records of the Dutch Government in Ceylon. *J. D'Alwis*.—The Stature of Gotama Buddha.

THE SOCIETY.

Illustrated Catalogue of the Museum of Comparative Zoology at Harvard College. No. VII. Revision of the Echini, by Alexander Agassiz, Parts 1—III, and Plates, Parts 1—IV.

THE HARVARD COLLEGE.

Notices of Sanscrit MSS., by Rājendralāla Mitra, Vol. II, Part IV.

THE AUTHOR.

Science des Religions. L'Islamisme d'après le Coran. L'enseignement doctrinal et la pratique, par Garcin de Tassy. Troisième Edition.

THE AUTHOR.

Meghadūta der Wolkenbote. Gedicht von Kālidāsa mit kritischen Anmerkungen und Wörterbuch, herausgegeben von Adolf Friedrich Stenzler.

THE EDITOR.

Preliminary Report on the first season's work of the Geological Survey of Yesso, by Benjamin Smith Lyman, 1874.

THE AUTHOR.

Dr. and Mrs. Mason's Land Leases in Toungoo, British Burma, by Mrs. Eleanor Mason.

THE AUTHORESS.

Dr. Mason's Last Days, by Mrs. Eleanor Mason.

THE AUTHORESS.

Ancient Laws of Ireland, Vol. III.

Lectures on the Manners and Customs of the Ancient Irish, by Eugene O'Curry M. R. I. A. Edited, with an introduction &c., by W. K. Sullivan, Ph. D. Vols. 1—3.

WHITLEY STOKES, Esq.

The Christian Spectator, for July, 1874.

THE EDITOR.

Rāmāyana, edited by Hemachandra, Part 4, No. 4.

THE EDITOR.

Daily Meteorological Observations of the St. Xavier's College Observatory, for the half-year ending 30th June, 1874.

THE PRINCIPAL, ST. XAVIER'S COLLEGE.

White Yajur-Veda, edited by Thakur Giriprasad Sing, Parts 5—6.

THE EDITOR.

Synopsis of the Results of the Operations of the Great Trigonometrical Survey of India, Vol. I. The Great Indus Series. By Col. J. T. Walker, R. E. and Assistants.

THE GOVERNMENT OF INDIA.

Selection of Papers regarding the Hill Tracts between Assam and
Burmah and on the Upper Brahmaputra.

THE GOVERNMENT OF BENGAL.

Annals of Indian Administration in the year 1872-73. Vol. XVIII.

THE GOVERNMENT OF BENGAL.

Report on the Stamp Revenue of the Central Provinces for the year
1873-74.

THE CHIEF-COMMISSIONER OF THE CENTRAL PROVINCES.

Report on Vaccination, throughout the Presidency and Provinces of
Madras in the year 1872-73.

THE GOVERNMENT OF MADRAS.

The Desatir, or Sacred Writings of the Ancient Persian Prophets, by
Mulla Firuz Bin Kaus, Vol. II.

Deaths in Bombay, from 1848 to 1863, 13 Parts.

Report on the Census of the N. W. Provinces, dated 1st January, 1853.

Census of the Island of Bombay, taken 2nd February, 1864.

Statistical Memoir of a Survey of the Nilgherry Mountains.

Weale's Series. Rudimentary Treatise on Agricultural Engineering, by

G. H. Andrews, Vol. I.

Rudimentary Treatise on Ship Building, by J. Perke, Parts 2 and 3.

Ditto of Recent and Fossil Shells, by S. P. Woodward.

Ditto Astronomy, by the Rev. R. Man.

Ditto Magnetism, by Sir W. S. Harris.

Equational Arithmetic, by W. Hipsley.

Rudimentary and Elementary Treatise on Steam and Locomotion, by
J. Sewell.

First Mnemonical Lessons in Geometry, Algebra and Trigonometry, by
the Rev. T. P. Kirkman, M. A.

An Investigation of the Dust Storms and Whirlwinds of India, by P.
F. H. Braddeley.

Barometrical Sections of India, by Surgeon E. Balfour.

On the methods of determining Terrestrial Longitudes, by Captain J.
Crisp.

Reports on the Proceedings of the Officers engaged in the Magnetic
Survey of India, Report No. X.

Chevalier Dubart's Principles of Hydraulics applied to Indian Irriga-
tion, by Major T. F. de Haviland, 1st Vol.

The Mammals of India, by Dr. T. C. Jerdon, (2 copies).

Chronological Tables, containing Corresponding Dates of the different
Eras, used in the Bombay Presidency, for the Century from A. D. 1752 to
A. D. 1852.

A Report on the Weights and Measures of the Konkun Province and the Territories subject to the Government of Bombay, by Capt. T. B. Jervis, Bo. Eng. 1829.

Records of Ancient Science exemplified and authenticated in the Primitive Universal Standard of Weights and Measures, by Capt. T. B. Jervis, Bo. Eng.

Table of Weights and Measures, for the Bombay Presidency.

Tables of Weights for reducing English Weight into British Indian Weight, and the contrary.

Vivāda Chintamāni, by Prasanna Cumar Tagore.

The Mohummudan Law of Sale, according to the Huneefee Code, by N. B. E. Baillie.

Digest of Hindoo Law Cases, Vol. II.

Labour Laws of Mauritius.

Vyavahara Mayukha, an authentic and complete Treatise embracing all the heads of Hindoo Law, translated by H. Borradaile, Bo. C. S., Surat, 1827.

Letters patent establishing the Supreme Court of Judicature at Bombay, 1844.

Letters patent establishing the Court of Judicature at Prince of Wales Island, Singapore and Malacca, 1827.

Letters patent for reconstituting the Court of Judicature at Prince of Wales Island, Singapore and Malacca, 1855.

An Act for Establishing High Courts of Judicature in India and papers relating thereto.

An English Translation of the Himyaritic Inscriptions, by Professor E. Osiander.

The Journal of the Bombay Branch of the Royal Asiatic Society, Nos. 21-25. 1862-1868.

Examination and Analysis of the Mackenzie MSS., deposited in the Madras College Library, by the Rev. W. Taylor.

The Bombay Engineer's Report for the official year 1849-50.

Professional Papers printed at the Civil Engineering College, Roorkee. No. II, Rajbhas. No. III, Earthwork.

Papers prepared for the use of the Civil Engineering College, Roorkee, No. IV, Earthwork. No. VI, Construction of Buildings, Part I.

On Blasting under Water by means of Galvanism, by D. Tresham.

Notes on Building and Road-making, compiled for the use of the D. P. W. Madras, 1855.

A treatise explanatory of a new system of Naval, Military and Political Telegraphic Communication, with a comprehensive Numerical Dictionary, by Lt.-Col. J. Macdonald, 1817.

Report of the Ganges Canal Committee on Major Crofton's Project for Remodelling the Ganges Canal, 1867.

Memoranda on the Western Jumna Canals, N. W. Provinces, 1849. by Major W. E. Baker, B. E.

Plates of Goodwyn's Memoir on the Taper-Chain Tension-Bridge.

Correspondence on the Proposed Railway in the Southern Mahratta Country, 1858.

Report on Projected Canals in the Delhi Territory, 1841.

Report on the Epidemic in the Moradabad District in 1854.

Report of the Indian Cattle Plague Commissioners, 1871.

Treatment and Management of Saxon Sheep in the Deccan.

Report on the Canal Irrigation of Rohilkund, by Capt. W. Jones, B. E. 1855.

Irrigation in the Madras Provinces, by Lt.-Col. R. Baird Smith, B. E.

On the Corn and Pasture Grasses of India, by Professor Royle.

Notes on the Propagation and Cultivation of the Medicinal Cinchonas, or Peruvian Bark Trees, by W. G. McIvor.

Annual Reports on the Sind Forests for 1858-59 and 1859-60.

The Tobacco Cultivator's Manual, by D. José Maria Dau, of Cuba.

The Cultivation of Orleans Staple Cotton, as practised in the Mississippi Cotton-growing Region.

Papers on Opium Cultivation in Khandeish, 1839.

A Statement and remarks relating to the Expenses of Irrigation from Wells in the Deccan &c., by Captain Meadows Taylor.

Papers relative to the execution of Irrigation Works, by Joint Stock Companies. (P. P. 1861).

Correspondence on the subject of the Drainage of Bombay, 1867.

Report on a Project for the Drainage of the Town of Madras, by Capt. Hector Tulloch, R. E.

Correspondence relating to the prohibition of Burials in the Back Bay Sands, 1855.

Correspondence relating to a proposed enactment for the regulation of places used for the Disposal of Corpses in the Town and Island of Bombay.

Analysis of the Mineral Springs and various Well and River Waters, in the Bombay Presidency, by H. Giraud, and R. Haines.

Report on the Quantity of Water raised from Wells in the Hyderabad Assigned Districts, 1856.

Report on the Mesmeric Surgical Operations of Dr. Esdaile, 1846.

Records of Cases treated in the Mesmeric Hospital, Calcutta, in 1847.

Notes on the Application of the Test of Organic Disease of the Spleen, as a means of detecting Malarious Localities in Hot Climates, by Surgeon T. E. Dempster.

Transactions of the Medical and Physical Society of Bombay, Nos. 3, 5, 6, Old Series, 1840-1843, and Nos. 3 and 4, New Series, 1855-1858.

Indian Annals of Medical Science, Nos. XVII, XX, and XXIV to XXVI.

Pharmacopœia of India, 1868, by Dr. E. J. Waring.

British Pharmacopœia, 1867.

Practical Observations on the Hygiene of the Army in India, by Stewart Clark, M. R. C. S.

Report on Leprosy, by the Royal College of Physicians, London.

Reprints for the Pundits—

No. 2, Physical Science, Parts 1 to 3.

No. 3, Method of Induction.

No. 4, Metaphysical and Mental Philosophy, Vols. I, II.

No. 6, Elements of Logic.

No. 8, Elements of Rhetoric.

Catalogue of the Duplicates, &c., of the India Office Library, 1862.

List of Books published by the Government of the N. W. Provinces, from 1840 to 1852.

Facts for Factories, being Letters on Practical Subjects, suggested by experiences in Bombay; by W. Walker.

Catalogue of the Arabic, Persian, and Hindústáni Manuscripts of the Libraries of the King of Oude, by Dr. A. Sprenger; Vol. I, Hindústáni and Persian Poetry.

Report on Education in Sind, March, 1856.

Annual Reports from the Governors of the Madras University, from 1845-46 to 1852-53.

Reports on Indigenous Education and Vernacular Schools in the N. W. Provinces, for 1851-52, and 1852-53, by H. S. Reid, Visitor General of Schools.

Reports on Public Instruction, Bombay, for 1863-64 and 1864-65.

Reports on the Progress of Education in the N. W. Provinces, 1864-65, and 1865-66.

Memorandum on Public Instruction in the Bombay Presidency, 1856-1865.

H. E. I. C. Education Despatch of 1854.

Report on the Revision of the Military Store Department, Bombay, 1830.

Practical Hints on the Proof of Gunpowder, by Major W. Jacob, Bo. Art.

Parliamentary Report on the Abyssinian Expedition, 1870.

Index to ditto.

Persian Expedition, Estimate of Extraordinary Expenditure on account of (P. P. 1857).

Persian Expedition, Correspondence about the Proportion of Cost to be charged upon the Indian Revenues. (P. P. 1857).

Persian Expedition, Correspondence about the proportion to be defrayed from the revenues of the United Kingdom. (P. P. 1857).

Account of the Total Annual Expenses of the Military Forces serving in each Presidency in India from 1850-51. (P. P. 1858).

Act authorizing Payments from the Indian Revenues in respect of Retiring Pay, Pensions and other expenses of H. M's. Forces serving in India. (P. P. 1862).

Return of the Actual Strength both of the Military Force in the Presidencies of Bombay and Madras and the Punjaub in October and Nov., 1858. (P. P. 1858).

Return of the Troops, European and Native, on the Establishment of each Presidency in India, in April, 1857. (P. P. 1860).

Report of the Parliamentary Commission on the Mutiny at Vellore. (P. P. 1861).

Report of the Parliamentary Committee on the Amalgamation of the English and Indian Armies. (P. P. 1861).

Order on the Amalgamation of the Indian Army with the Line and Despatches relating thereto. (P. P. 1861).

Mortality among Women and Children in the Dum-Dum Barracks in 1858. (P. P. 1859).

Correspondence on the Expenditure in the China War from 1840-1843. (P. P. 1857).

Correspondence relating to Affairs in China. (P. P. 1860).

Papers regarding the Balance of Expenditure on account of the China War. (P. P. 1854).

Account of Payments to the Government of India on account of the China War to 1861. (P. P. 1861).

Account of Claims of the Government of India on account of the China War. (P. P. 1861).

Return of Officers in the Royal Army who distinguished themselves in the second Burmese War. (P. P. 1856).

Further Return of Distinguished Officers of the second Burmese War.

Report of Committee for the Investigation of the Coal and Mineral Resources of India, May, 1845.

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- Observations on Substitutes for Hemp and Flax, by Dr. Roxburgh.
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 Tabular and Descriptive Lists of Articles from Malwa, Khyrpoor, Cutch, and the Bombay Presidency, for the Grand Exhibition of 1851.
 Madras Exhibition of the Raw Products of Southern India, 1859.—
 On the Cotton of the Gigantic Nettle-wort (*Calotropis Gigantea*), as also on the Silk-worm and Silk Manufacture in Bengal, Bombay, China, Madras and Mysore.
 Correspondence relative to the Valuable Properties of the American Sumach (*Cæsalpinia coriaria*), as a Tanning Plant, by Dr. Wallich.
 Correspondence on Cotton Cultivation in Dharwar.
 Tobacco—its Cultivation and Preparation in the Phillippine Islands.
 Minute regarding the Cultivation of Cotton, by Sir J. R. Carnac, Governor of Bombay.
 An Essay on Female Infanticide, by Bhawoo Dajee.
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Thesaurus of English and Hindustani Technical Terms, by Capt. H. G. Raverty.

Dictionary, English and Guzarati, by E.P. Robertson, C. S. (Bo.).

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Sakuntāla, or the Lost Ring, translated into English Prose and Verse, from the Sanskrit of Kālidāsa, by Monier Williams, M. A.

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Report on the Coal and Iron districts of Bengal, by Mr. David Smith.

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Report on Kutch and part of Sind, by Sir J. Malcolm, 1830.

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Practice of taking Nuzzurs, Bombay, 1827.

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" Province of Malabar, in the years 1792 and 1793 (re-printed at Madras, 1862).

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Return of Petitions presented during 1860 for the admission of the Bible into the Government Colleges and Schools in India. (P. P. 1861.)

Correspondence respecting Relations with Persia. (P. P. 1857.)

Statements exhibiting the Moral and Material Progress and Condition of India during the years 1859-60, 1860-61, five parts.

Papers relating to the Nizam. (P. P. 1859.)

" " Amir Ali Moorad's Claim. (Coffey's Petition). (P. P. 1858.)

Correspondence referring to the Duties of the Dewanny of the Provinces of Bengal, Behar and Orissa. (P. P. 1870.)

Memorial to the Secretary of State with reference to the admission of the Natives of India to the Medical Department of the Army, and Reply thereto. (P. P. 1861.)

Correspondence on the subject of the Settlements in the Straits of Malacca. (P. P. 1858.)

Correspondence relative to the Annexation of the Berar Territory. (P. P. 1856.)

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Papers relating to the Property of the late Nawab of Surat. (P. P. 1857.)

„ Amir Ali Moorad's Case. (P. P. 1858 and 1860.)

Convention between Her Majesty and the Emperor of the French relative to the Emigration of Labourers from India to the Colony of Reunion. (P. P. 1160.)

Despatch respecting Coolie Immigration into the Island of Réunion from British India. (P. P. 1863.)

Copy of the Covenants entered into by Members of the East India Civil Service. (P. P. 1861.)

Opinions recorded by the Council of India on the Directions for the Preparation of a Bill to Confirm certain Appointments in India, and to amend the Law concerning the Civil Service of India. (P. P. 1861.)

Convention between Her Majesty and the Sultan for the Establishment of Telegraphic Communication between India and the Ottoman Territory. (P. P. 1865.)

Papers relative to Telegraphic Communication in the Mediterranean, and with India. (P. P. 1860.)

„ „ the intended Transfer of the Falmouth and Gibraltar Cable to a Line from Rangoon to Singapore. (P. P. 1860.)

Minutes of Evidence taken before the Select Committee on the Red Sea and India Telegraph Bill. (P. P. 1861.)

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Finance and Revenue Accounts of the Government of India, for the year 1859-60. (P. P. 1861.)

Correspondence on the probable Financial results of the Abolition of Pilgrim Taxes, and other sources of Revenue from Religious Establishments, 1836.

Memoranda on the N. W. Frontier of British India, drawn up by desire of Sir J. Malcolm, 1830.

Extract from a Report on the District of Babriawar, in Kattywar, 1813.

Selected Reports on the Revision of Settlement in the Delhi Territory, Parts 1 and 2.

A Report exhibiting a view of the Fiscal and Judicial system of Administration, introduced into the Conquered Territory above the Ghauts, by W. Chaplin, 1838.

Selections from the Records of the Madras Government.—No. III. Report on the Proposed Abolition of the Madras Mint. No. IV. Report on the Putniban Channel. No. V. Collective Memorandum on Public Works in the Madras Presidency.

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Report of the Conservator of Forests, Madras, 1863-64.

Report on the Main Drainage of Bombay, by R. Aitkin, dated 21st December, 1866.

Report on the Experimental Revenue Settlement of certain Villages forming Kownaee Talooka of the Nassick sub-collectorate, 1853.

Report on the Badamee and Bagulkote Talookas, Belgaum, 1853.

Memoir on the Zillah of Baroche, 1855.

Report of the Committee on Prison Discipline, Calcutta, 1838.

Annual Report on the Management and Conservancy of the portion of the Oudh Forest lying between the Sardah and Koorially Rivers, 1861-62.

Report upon the Agra Jail Epidemic Cholera of 1861.

" " General Condition of the Province of Kattcewar in 1812.

" " Settlement of Zillah Humeerpore, 1842.

" " " Zillah Etawah 1844.

Selections from the Records of the Bombay Government in the Police Branch of the Judicial Department, Nos. I and II, 1853.

Report of the Committee of Enquiry on the Colaba Observatory, 1865.

Selected Minutes by the Hon. M. Elphinstone, in the Military Department, 1820 and 1827. Bombay, 1867.

Reports of the Civil Judicial Administration of the Bombay Presidency in 1848, 1851-54, 1862.

Survey and Assessment Report of the Poona Collectorate, 1828.

Survey Reports on the Purantey, Hursol, Morassa, Bayur, Verangam, and Duskroee Pergunnas, in the Ahmedabad Collectorate, 1827.

Report on the Mhairwarra District, 1841.

Compilation of Papers selected from the Records of the Government of Bombay, Revenue Department, relating to Artificial Irrigation, 1838.

Correspondence of the Inam Commission on the Deccan Surinjams, 1856.

Circular Orders of the Revenue Department, Bombay. Two Volumes.

Selection of Papers from the Records of the East-India House, Vol.

III. 1826.

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Bombay Mint Assay Report of Mahmooddee and Soojace Rupees, from the Punjáb.

" of four different descriptions of Gold Coins.

" of Java Guilder pieces.

" of Punjaub Coins and new and old Furruckabad Rupees.

" of " Nasirooddeen Shah Kerans," from the Persian Gulf,

1862.

" of 200 Rupees of different descriptions, from Baroda.

Rates at which Company's or Bombay Rupees are Legal Tender, 1836.

Notes regarding Meenas, and other Criminal Classes in the Goorgaon District. Lahore, 1865.

Reports of Road and Tank Department (Bombay) for 1844-45, 1845-46.

Report on the Judicial Administration, Madras, 1863 and 64.

Bombay Public Works Budget, for 1862-63.

Compilation of Circular Orders relative to Police matters passed by the Faujdaree Adaulut of Bombay from 1824, to 1852.

Circular orders of the Government of Bombay on Police subjects, Vol. I, 18th October, 1852 to 29th June, 1853, and Vol. II, from July, 1853 to 30th Sept. 1855.

Report on the Ganges Canal, Vol. III, Plans.

Dorjiling, by H. V. Bayley, 1838.

History, Antiquities, Topography and Statistics of Eastern India, by Montgomery Martin, Vols. I to III, (Vol. I; 3 copies, Vol. II; 1 copy and Vol. III; 3 copies).

Report on the Pulni Mountains, to accompany the Series of Sketches by Lt.-Col. Hamilton, 1864.

Report on Passages made on the Nerbudda River from Dharee to Mundlaisir, and from Mundlaisir to Broach, by Lieuts. Keatinge and Evans.

A brief Historical Sketch of the Bheel Tribes inhabiting the Province of Khandesh, by Capt. D. C. Graham, 1843.

Translation of M. Gilbert's Notes on Abyssinia.

Reports on the Districts of Midnapore and Cuttack, by H. Ricketts, C. S.

Report on the State and Navigation of the Indus, below Hyderabad, in 1836.

On the Course of the River Nerbudda, by Lieut. Col. Ouseley, 1845.

Supplement to the Itinerary for Western India, by Captain J. Clunes.

Memoir accompanying a Chart of the Upper Indus by Lieut. Grounds, I. N., 1852.

Description of the North-East Coast of Australia by Captain King.

Australian Navigation—Journal of H. M. Ship Crocodile, from Sydney through Torres Straits.

Map of the Hyderabad Collectorate.

Survey Map of the Island of Oorum.

Chart of the Gulf of Cutch.

Map of the Island of Bombay.

Map of Abyssinia, 5 sheets.

Map of Maritime Arabia.

Map of the Poona Collectorate.

” Dushpore Pergunna, Ahmedabad Collectorate.

” Tanna Collectorate.

” Guzerat.

” Scinde, 4 sheets.

” Cutch and the Runn.

” Rajputana.

” Sattara Territory.

Cotton Map of the Madras Presidency.

THE GOVERNMENT OF BOMBAY.

Purchase.

Pratna Kamra Nandini, Vol. VII, No. II.

Dictionary of the Páli Language, by Robert C. Childers. Part. I.

Conchologia Indica, Part 6.

The Calcutta Review, July, 1874.

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Nature, Nos. 240-244.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR NOVEMBER, 1874.

The monthly General Meeting of the Society was held on Wednesday, the 4th instant, at 9 o'clock p. m.

Col. H. Hyde, President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From the Secretary to the Government of India, Foreign Department—a set of Photographs of the paintings in the Ajunta Cave Temples.

2. From Bábu Udaychand Dutt, Civil Medical Officer, Noák'háli, a skull and some bones of a huge sea fish cast ashore on the Island of Sondip.

Mr. Wood-Mason stated that the bones lying on the table were in all probability those of a small individual of the whale, *Balenoptera indica*, of which a gigantic specimen was represented in the Society's collection by the two rami of a mandible and some other bones. The Indian Museum also possessed an almost perfect skeleton of the same species which had been obligingly secured for the collection by the Hon'ble Ashley Eden, having been stranded in the estuary of the Sittang River. The bones now sent included the skull less the bones of the face, the basihyal with the ankylosed thyrohyals, a perfect scapula, a radius and an ulna of opposite sides, some vertebræ without epiphyses and some epiphyses without vertebræ, some fragments of ribs, &c. Every fragment of the skeleton of these great marine Mammals was of value, and these bones, their fragmentary condition notwithstanding, would form a valuable addition to the Museum, but it was much to be deplored that the donor did not sooner make up his mind to forward them, while they were more perfect and more numerous.

3. From Sharif Salim Ahmad Sáhib, Bombay—a copy of the Vichar Sagar, a Sanskrit work on Vedantic philosophy.

4. From L. Schwendler, Esq.—a copy of his 'Instructions for the electrical testing of lines and offices, No. III.'

The following gentlemen duly proposed and seconded at the last meeting were elected Ordinary Members—

A. Constable, Esq.
R. Knight, Esq., Calcutta.
Bábu Bhugobutty Churn Mallik.

The following gentlemen are candidates for ballot at the next meeting—
Maulawí Khudá Bakhsh Khán Sáhib, Pleader, Bankipore, Patna, proposed by Mr. H. Blochmann, seconded by Col. H. Hyde.

Bábu Rám Dás Sen, Zamíndár, Berhampore, proposed by Col. H. Hyde, seconded by Mr. H. Blochmann.

Captain Protheroe, Dy. Commissioner, Port Blair and Nicobar Islands, proposed by Mr. J. Wood-Mason, seconded by Dr. T. R. Lewis.

R. E. Egerton, Esq., Financial Commissioner, Panjáb, proposed by Major-General R. Maclagan, seconded by the Hon'ble E. C. Bayley.

The following gentlemen have intimated their desire to withdraw from the Society—

Captain E. Swetenham; F. R. Mallet, Esq.

The President then announced to the meeting that a Geographical Congress would be held in Paris in spring 1875.

He said that he had received a letter from the French Consul General, Calcutta, forwarding a prospectus by the promoters of the Congress together with a collection of 123 geographical questions upon which information was specially solicited. He had ordered a copy of these questions to be kept in the office, should any member wish to see them, and he would now read out the letters. As the Committee of the Congress desired to have the addresses of gentlemen likely to take an interest in the scheme, the Council had proposed the following names—Col. H. Hyde, R. E., President, Asiatic Society; Col. H. L. Thuillier, C. S. I., Surveyor General of India; Col. J. T. Walker, R. E., Superintendent of the Great Trigonometrical Survey; Col. J. E. Gastrell, Superintendent Revenue Survey; W. T. Blanford, Esq., Geological Survey; Captain J. Butler, Political Agent, Nágá Hills; Col. E. T. Dalton, C. S. I., Commissioner of Chota Nagpore; J. W. Edgar, Esq., Dy. Commissioner of Darjeeling; Sir T. D. Forsyth, K. C. S. I., C. B.; W. Heeley, Esq., C. S.; Captain W. G. Hughes, Dy. Commissioner, Hill Tracts, Arakan; Dr. W. W. Hunter, Director-General of Statistics; Dr. J. King, Superintendent, Botanical Gardens, Calcutta; S. Kurz, Esq., Curator, Herbarium, Calcutta; Lieut.-Col. W. E. Marshall, Simla; S. E. Peal, Esq., Seeksagar, Assam; The Hon'ble Justice J. B. Phear, Calcutta; Bábu Rájendralála Mitra, Calcutta; Dr. D. Brandis, Inspector General

forests, Calcutta; Dr. W. Schlich, Conservator of Forests; Commandant A. D. Taylor; W. Theobald, Esq., Geological Survey; Capt. W. J. Williams, Garo Hills; Capt. J. Biddulph, A. D. C. to the Viceroy; Capt. W. T. Trotter, R. E., Great Trigonometrical Survey; J. B. Hennessey, Esq., do.; Capt. W. J. Heaviside, R. E., do.; Ney Elias, Esq., British Burma; Dr. J. Anderson, Calcutta; Major-General A. Cunningham, C. S. I., Simla; Major T. Lewin; Dr. H. Cayley; Capt. H. C. Marsh; R. T. St. John, Esq., British Burma; Major T. G. Montgomerie; W. Johnson, Esq., Ladakh.

The following were the letters—

1. From the French Consul General, Calcutta, 5th August, 1874.

"I have the honor to forward you a copy of a letter, with enclosures, I have received from the French Geographical Society, through the Ministry for the Foreign Affairs, relating to the International Congress of the geographical sciences to be held in Paris during the spring of the next year.

"From the letter of the President of the Society, you will see that the Committee of the Congress would be most happy to be assisted in this undertaking by the foreign learned Societies as well as by men of science and travellers of all countries. I take, therefore, the liberty to ask you whether I might name the Asiatic Society of Bengal for the International Honorary Committee.

"I shall feel obliged by your suggesting at the same time the names of the travellers to whom I might appeal in this country on behalf of the Congress.

(Signed) E. AUDISIO;

Acting Consul General for France."

2. From the General Secretary, 10, Boulevard Latour-Maubourg, Paris.

INTERNATIONAL GEOGRAPHICAL CONGRESS.

(Translation.)

"The knowledge of our terrestrial dwelling is a science," said one of our most distinguished geographers, "with which we are connected by the most intimate ties: few subjects touch upon so numerous and large interests."

"And yet like all other sciences, Geography was for a long time the exclusive province of a few scholars. It had no share in the movement which carried mankind towards study, till the taste for scientific researches spread over the world. Governments countenanced its progress, then free associations were successively formed in different places, in order to give to the geographical pursuits a quicker impulse. These Societies had scarcely been created when they experienced the need of having their separate works collected, at first by a regular correspondence being established,

and afterwards, thanks to the easier ways of communication, by inviting discussions all men who devoted themselves to such important problems.

'This was the object which brought about the Congress held in 1871 at Anvers; and if the great and legitimate success of this scientific festival was principally due to the enlightened zeal of eminent leaders and to the eagerness of many adherents, we must also trace it to the exceptional interest of the science itself, the field of which is cultivated by many and thus proves a common arena for varied researches.

'This is the way, which the Geographical Society of Paris intends to follow in its turn, encouraged by the very first men who had pointed it out. Strengthened by the support of the President of the Republic and expecting to obtain the support of foreign governments, it has decided that a new Geographical Scientific Congress shall be convened in Paris during the spring of the year 1875.

'To study the earth in its various aspects, its physical constitution, the manifestations of life on its surface; to examine the ways to measure and represent it and determine its relations to the heavenly bodies; to re-establish the successive states of our planet at its different epochs and find out on the soil the traces of the history reconstructed by modern erudition; to try to render the intercourse between nations quicker and easier, and give man, by degrees, the whole habitable surface; to compare with each other methods of teaching and to concentrate the exertions tending to the diffusion and advancement of science; to act in concert in explorations to be undertaken; to state what is certain, discuss what is doubtful, and to find out by a theoretical and practical study of the earth what is not yet known, this is the aim of the Paris Congress.

'We therefore appeal to geographers who specially devote themselves to this branch of study; to the learned men who in other pursuits require the aid of Geography; to the travellers who, at the risk of their lives, have widened the horizon of Science and multiplied the roads of trade; to the professors who by their teaching or writings, have contributed to the spread of geographical knowledge; to the engineers who, by their admirable works, have created roads of communication all over the world; to all those at last, and there are many, who take a deep interest in these questions and think it useful to propagate more and more a thoroughly necessary science.

'We invite to this peaceful land men of all countries, knowing that they will bring with them no other passion but the passion for truth. We shall especially ask the assistance of foreign scientific Societies and request them to send delegates, to name the gentlemen to whom letters of convocation ought to be sent, to point out the questions which might be advantageously put.

'The Congress will be followed by an Exhibition of the objects relating to the study of Geography. Rewards will be distributed to the most deserving amongst the exhibitors.

'This is the whole of the program of the measures which the Geographical Society will take in order to give the movement all the splendour it deserves. The Society, relying on the usefulness of its undertaking and supported by high patronage and by many friends, will devote itself with solicitude and perseverance to a work of enlightenment and peace.

(Signed) *BARON DE LA RONCIERE-LE-NOURY, Vice-Admiral,*

President, Geographical Society, Paris.

DELESSE, INGENIEUR EN CHEF DES MINES,

President, Central Commission.

MAUNOIS,

General Secretary, Geographical Society.

BARON R. REILLE,

Commissaire Général du Congrès.

Paris, 28th March, 1874.'

The President then said—At the General Meeting of the Society in April last, the Council recommended for the consideration of Members certain alterations in Rules 14, 31d, and 36, of the Bye-Laws of the Society. The usual voting papers had been sent to all Non-Resident Members, of whom fifty-one had forwarded their votes to the Secretary. It was the business of this evening to take the votes of the Members present. He would order the Secretary to distribute the voting papers, and read out in the meantime the rules as they had hitherto stood and the amended rules as proposed by the Council.

I.

Present Rule.

Sec. 14A. In the event of an Ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 12 rupees *per annum*, commutable into a single payment of Rs. 100: provided that if any such Member shall thereafter return to India, he shall thereupon become liable to pay his original subscription, subject to

Proposed Rule.

Sec. 14A. In the event of an Ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 16 rupees *per annum*, commutable into a single payment of Rs. 150: provided that if any such Member shall thereafter return to India, he shall thereupon become liable to pay his original subscription, subject to

the operation of Rule 10 B.

the operation of Rule 10 B., and provided that Members who are at present paying Rs. 12 *per annum*, or who shall have paid Rs. 100 as composition, shall not be called on to pay the higher rates.

II.

Present Rule.

Sec. 34 (d). The President, or, in his absence, one of the Vice-Presidents, shall take the Chair. If neither the President, nor one of the Vice-Presidents, be present within fifteen minutes after the hour appointed for the Meeting, the Members present shall elect a Chairman.

Proposed Rule.

Sec. 34 (d). The President, or, in his absence, one of the Vice-Presidents, shall take the Chair, or in their absence the Senior Member of the Council. If neither the President, nor one of the Vice-Presidents, nor a Member of the Council, be present within fifteen minutes after the hour appointed for the Meeting, the Members present shall elect a Chairman.

III. That the following Rule be added after Rule 36.

36A. "With reference to the provisions of Act XVII. of 1866 (The Indian Museum Act), Section 3, the Trustees of the Indian Museum on the part of the Society shall be nominated from among the members of the Council, with the proviso that on vacation of their seats in the Council they shall resign their Trusteeships."

Messrs. D. Waldie and E. Gay, at the request of the President, collected the voting papers and acted as Scrutineers.

The Scrutineers then gave the results to the President, who announced, in accordance with the Society's Bye-Laws which require a majority of three-fourths in case Rules are altered,—

First, that the proposed alteration of Sec. 14 A. was *not* carried.

Secondly, that the proposed alteration of Sec. 34 (d) and the addition to Sec. 36 were carried.

The President then said, he wished to remind the members of the facility which the Council had afforded them of visiting the Library of the Society on Friday mornings at 7 A. M. The time of opening had been altered in consequence of a request made by several members, who had no leisure to consult the Library in the course of the day. Very few members, however, in fact only four, had since June last availed themselves of the early opening. The arrangement was productive of a small outlay; but the Council had at present no wish to do away with it, at least not during the cold season, and he thought it would be well, again to draw the attention of the members to the convenience that was afforded them of consulting the Library once a week in the morning.

The President also announced on the part of the Council that during the absence of Capt. J. Waterhouse and Col. Gastrell, Mr. H. Blochmann

would act as General Secretary and as Treasurer of the Society, in addition to his duties as Philological Secretary.

Also, that they had appointed Bábu Gopal Chandr Dutt as First Clerk of the Secretary's Office, on Rs. 60 a month; and that Yúsuf Ali, Store-keeper, had been dismissed.

The Secretary laid before the Meeting a Copper plate, presented to the Society by Mr. A. L. Clay, C. S.

Mr. Clay states that the plate was found at the time of re-digging a pond in Nasirábád, a village on the south-east corner of the town of Chittagong. The pond formerly belonged to the Bhats of the village; but it now belongs to a Muhammadan.

The plate is a grant of land made in 1165 Saka, or 1243 A. D., by Rájá Dámudar Deb, son of Bású Deb, son of Madhusudan Deb, son of Purushottam, of Tripura (Tiparah).

Mr. Blochmann said that the plate was of great interest as it shewed that Chittagong (Chátgáon) belonged in the beginning of the 13th century, when the Muhammadans had just conquered Bengal, to the Maharájas of Tiparah. The plate mentions the names of four of them. They are, however, not given by Rev. J. Long in his short Analysis of Ráj-Málá, a poem which contains the family history of the Maharájas (Journal, Vol. XIX, for 1858.)

The plate had been made over to Bábu Prannáth Pandit, member of the Society, who had read and translated it. A facsimile of the plate and the Bábu's remarks on it would be published in the fourth number of the Journal, Part I, for 1874. The thanks of the Society were due to Mr. Clay for his interesting presentation.

The President exhibited one gold and two silver coins belonging to himself.

Mr. Blochmann said that the first coin, a small thick silver piece, not much larger than a two-anna piece, contained on one side the words

محمود شاه بن لطيف شاه سلطان

Mahmúd Sháh ibn Latíf Sháh, the king.

The reverse was too much cut away. The coin is a Gujarátí coin. Mahmúd Sháh, III., son of Latíf Khán, son of Muzaffár Sháh, reigned from A. D. 1537 to 1553; *vide* Thomas, Chronicles, pp. 351 to 353.

The second was a small square Kashmír silver coin.

OBVERSE—محمد همايون سلطان Muhammad Humáyún Sultán.

REVERSE—ضرب کشمير Struck at Kashmír.

The year is effaced. It is curious that the letters of the reverse are inverted, but they are easily made out by holding the coin before a looking-glass.

The third coin was a posthumous gold coin, containing the name Ahmad Sháh of Dihlí. The obverse, as usual in the coinage of the 18th century, forms a distich (metre, *long Ramal*)—

حكم شد از قادر بیچون باحمد پادشاه * سكه زن برسيم و زر از اوج ماهي تا بماه

The Almighty who has no equal gave Ahmad Sháh the order to coin silver and gold from the Fish [upon which the earth stands] to the Moon.

REVERSE—ضرب دار الخلافت جلوس ميمنت مازوس سنة ۱۱۰۰

Struck at the capitál [Sháhjahánábád], in the 14th year of the auspicious accession.

The coin is not rare, but curious, inasmuch as it was struck when Ahmad Sháh was no longer reigning emperor.

Ahmad Sháh, son of Muhammad Sháh, succeeded his father on the 2nd Jumáda I, 1161, or 19th April, 1748*; he was deposed by 'Imád ul-Mulk in the end of Jumáda II, 1167, or beginning of 1754; was blinded by him on 10th Sha'bán, 1167, or 2nd June, 1754; and died in prison on 2nd Sha'bán, 1188, or 25th May, 1774. Ahmad Sháh, therefore, only reigned six years.

The 14th year, therefore, would commence on the 2nd Jumáda II, 1174; and the 11th year, which some coins have, on the 2nd Jumáda II, 1171. But specimens in the possession of Mr. Delmerick have not only the 11th and 14th years on the reverse, but also the years 1170 and 1173 respectively on the obverse; and as the accession of Ahmad Sháh Durrání took place in 1160, Nádir Sháh having been killed in Jumada I, 1160, the 11th and 14th years of the Durrání's reign would correspond to 1170 and 1173. It looks, therefore, as if the coinage of Ahmad Sháh of Dihlí was *revived* during Ahmad Sháh Durrání's stay in India in 1170 and 1173-74, the names of both kings and the month of their accessions being the same. The commencements of their reigns differed by exactly one year.

In 1170, Ahmad Sháh Durrání married the daughter of the late Muhammad Sháh; he was, therefore, brother-in-law to the blind Ahmad Sháh of Dihlí.

Mr. Blochmann exhibited a Persian MS., belonging to him, containing a 'Collection of Choice Poems.' The MS. is beautifully written and richly ornamented. It was the property of the Prince Khurram [Sháhjahán], who at the age of fourteen entered on the fly leaf of the MS. the following remark—

* In Prinsep's 'Useful Tables' by Thomas, pp. 198 and 199, there are four mistakes well worth correcting:—

1026 A. H. commences on 30th Decr. 1616, not 1617.

1060 A. H. commences on 25th Decr. 1649, not 1650.

1127 A. H. commences on 27th Decr. 1714, not 1715.

1161 A. H. commences on 22nd Decr. 1747, not 1748.

پنجم آذر سنه اول سنه ۱۰۱۴ داخل کتابخانه علیحضرت ظل الهی نور الدین
جہانگیر پادشاہ بن اکبر پادشاہ حرره بیدہ خرم بن جہانگیر *

The 5th A'zar of the first year of the reign, in A. H. 1014 [A. D. 1605]. Belonging to the library of his august majesty, the shadow of God, Nûr-uddîn Jahāngir Pādishāh, son of Akbar Pādishāh. Written with his own hand by Khurram, son of Jahāngir.

The autograph, curious to say, bears the same date as Jahāngir's autograph, published in *Journal, A. S. Bengal*, 1870, Pl. XIII, and p. 271, and *Proceedings for July 1869*, p. 190. It is, therefore, clear that both autographs were written by Jahāngir and Prince Khurram on the same day when inspecting the Library, and thus prove each other's genuineness.

It is a pity that the MS. does not give the name of the *Kātib*.

Mr. Blochmann laid before the meeting translations of the following inscriptions from A'grah, Sikandrah, and Nārnaul, in continuation of the inscriptions published by him in the *Proceedings of the Society for August last*.

A'grah.

The following inscription is taken from the Dihli Gate of the A'grah Fort. Mr. Keene says that it is found in the ground floor chamber to the right of the Dihli Gate. The prose portion on the top is incomplete, some of the letters being broken, and refers to Akbar's march to Khāndesh and his return to A'grah.* The poetical portion below contains a *tārikh* by the poet Muhammad Ma'cūm Nāmī, of Bhakkar,† on Jahāngir's accession in 1014, A. H., or A. D. 1605. The text of the inscription I have taken from the "*Transactions of the Archaeological Society of Agra*," 1874, p. xx.‡

حضرت شاهنشاه جم جہا خلافت پناہ ظل اللہ جلال الدین محمد اکبر پادشاہ
در سنہ ۱۰۰۸ توجہ فرمود و در سنہ ۱۰۱۰ نزول اجلال فرمود
چون بملذذ آگرہ جای گرفت *
شاہ جہان چون گرفت جایی بتخت شرف • تخت ز رفعت نہاد بر وزیر چرخ پا
دست دعا برکشاد پیر فلک از نشاط • گفت کہ بادا مدام حکم تو فرمان روا
خواست کہ نامی کند سال جلاوش رقم • بود دران دم لبش پر ز ثناء و دعا
میل دو چشم حسود یک الفش کرد و گفت • باد جہان پادشاہ شاہ جہان گیر ما
قائلہ و راقعہ محمد معصوم البکری اصلا

His Majesty, the Emperor, a Jām in dignity, with whom royalty takes refuge, the shadow of God, Jalāluddîn Muhammad Akbar Pādishāh, set out in 1008 and arrived in 1010 in A'grah.

* Like the Fathpūr Sīkrī Inscription in the *Proceedings for August*, p. 175.

† *Xin Translation*, pp. 514, 515.

‡ Mr. Carlisle's reading in Vol. IV. of General Cunningham's *Archaeological Report* (p. 114) makes no sense. General Cunningham's footnote (*loc. cit.*, p. 115) is undoubtedly correct: Nāmī had been dead for some time when Shāhjahān succeeded to the throne.

1. When the king of the world took his seat on the throne of distinction, the throne thus exalted placed its foot on the revolving sphere.

2. And the ancient heaven from joy extended the hand of benediction, and said, 'May thy rule be royal for ever!'

3. Námí wished to write down the date of his accession, his lips being at the same time full of praise and blessing;

4. Its Alif pierced the two eyes of envy, and he said "May our king J a h á n g í r be the king of the world?" 1015—1 = 1014, A. H.

*Its Alif, i. e., the Alif of the tārīkh, pierces the eyes of envy, i. e., of critics; hence critics cannot see that the tārīkh contains a superfluous alif, or 1. On adding up, therefore, we get 1015—1 = 1014.**

Jahā'ngir's Black "Marble" Throne in the A'grah Fort.

This large marble slab, which is 10 ft. 7½ in. long, 9 ft. 10 in. broad, and 6 in. thick, lies at present in Sháh Jahán's palace (the *Diwán i Khāp*) in the fort of A'grah. It has often been seen and described by travellers (*vide* Mr. Keene's 'Hand-book for Visitors to Agra,' 1874, p. 19). The stone is a historical record of Jahā'ngir's rebellion against his father. While Akbar was in Khāndesh, Sháh Salīm (as Jahā'ngir was called as prince) proclaimed himself emperor at Ilāhābād, and it was there in 1011, that he gave orders to have the stone cut. From Ilāhābād it was subsequently, at Jahā'ngir's request, brought to A'grah, as will be seen from the following passage from the *Tuzuk i Jahā'ngirī* (p. 85, Sayyid Ahmad's edition):—

"Daulat Khān [a eunuch, who afterwards was Faujdār of Ilāhābād and Sirkār Jaunpūr], whom I had some time ago sent to Ilāhābād to fetch the black stone throne, arrived on Wednesday, 4th Mihr, 1019 [August, 1610] with the stone all safe and uninjured. It is, indeed, a fine slab of stone, very black, and very shining. Many believe that it a kind of touchstone (*sang i mihak*). It is 3½ ells (*dara'*) long, and 2½ *dara'* [3½ ?] 1½ *tasú* broad, and its thickness is 3 *tasú*.† I ordered clever stone-cutters to engrave

* This idea is not new. Thus the *tārīkh* of the birth of the Emperor Humáyún given in the *Akbarnámah*, is (metre, *short Ramal*)—

سال مولود هما یونش هست زو اك الله تعالى قدرا

بوده ام يك الف از تاريخش تاكشم ميل دو چشم بدر

The year of his august (humáyún) birth lies in the words 'May God Almighty increase thy worth!' [914 A. H.]; but I have removed an Alif from the *tārīkh*, in order to blind with it the evil eye.

This gives 913 A. H. Humáyún was born on Monday night, 4th Zí Qa'dah, 913.

The letter Alif looks like a needle.

† Assuming Mr. Carlleyle's measurements to be correct (Archaeological Report, IV, p. 132), we would have to alter the breadth, 2½ *dara'* 1½ *tasú*, given in the *Tuzuk*, to 3½ *dara'* 1½ *tasú*. In that case we have—

3 *tasú* in *Tuzuk* = 6 inch. measured by Mr. Carlleyle.
or 1 *tasú* = 2 inches.

on the sides suitable verses. They have also made feet for it of the same kind of stone. I sit very often on it."

The text of the inscription on the stone is taken from Mr. Beale's *Miftāh ut-tawārikh* (p. 207), as it agrees with the text in the Transactions of the Archaeological Society of Agra, 1874. "The stone is at present cracked in two—the cause of the fissure is unknown." (Metre, *khafif*.)

پادشاه که تیغ او سبزد * چون دویگر سرعدو بدونیم
باشد این تختگاه فرخنده * تکیه گاه خدایگان کریم
محتک خسروان پایتخت ملک * مهر و مہرا عیار برز و سیم
در دجا مثل بدر تابنده * لولوی بے بها چو در یتیم
پی تاریخ او به فکر شدم * مددے جستم از خدای حکیم
تا فلک تختگاه خورشید است * گیت ماند سریر شاه سلیم

1. (He is) a king whose sword cuts the head of the enemy into two halves like the Gemini.

2. May this auspicious throne be a seat (pr. a place to lean on) for the generous king.

3. A touchstone for the grandees (who form) the basis of the kingdom, and a test for the sun and the moon upon gold and silver.*

4. It is like a shining moon in the darkness of night; a priceless pearl like a unique gem.†

and $3\frac{1}{2}$ *dara'* in *Tuzuk* = $127\frac{1}{2}$ inch, measured by Mr. Carlleyle = $63\frac{1}{2}$ *tasū*.

∴ 1 *dara'* = $16\frac{1}{4}$ *tasū*, = $16\frac{1}{2}$ *tasū* nearly.

= 33 inch. nearly

and again $3\frac{1}{2}$ *dara'* $1\frac{1}{2}$ *tasū* = 118 inch, measured by Mr. Carlleyle = 59 *tasū*.

∴ 1 *dara'* = $16\frac{2}{3}$ *tasū*.

= 33 inch. nearly.

But that 1 *tasū* = 2 inch. seems improbable from other measurements, and I do not think that the measurements as given in Sayyid Ahmad's edition of the *Tuzuk* are correct, unless indeed 1 *dara'* = 1 *ilāhī gaz*. *Vide* also *Tuzuk*, p. 234.

* The metre shews that we have to read *mulk*, kingdom, and not *maluk*, angels, as translated by Mr. Carlleyle and in the Agra Transactions. "A test for the sun and the moon upon gold and silver," means a test for gold and silver, in allusion to Jahāngir's opinion that the stone was a kind of touchstone (*kasautī*). The stone is called "a touchstone for the grandees, the basis of the kingdom," because their gathering round it proved, in the eyes of the rebellious Shāh Salīm, their faithfulness.

† Mr. Carlleyle, who has not seen where the inscription commences, read this distich—

مسند با صفا ز نور و ضیا گوهر بے بها چو در یتیم

at from its light and brilliancy, a priceless jewel like a unique pearl.

ically correct.

5. I was lost in thought searching for a *tárikh* for it, seeking help from God, the Judge,
 6. And it (my thought) said, 'As long as the heaven is the throne of the sun, the throne of Sháh Salím shall remain.'

The *tárikh* lies in the words *mánuad sarir i Sháh Salím*, which give 1011, or 1602, A. D., when Salím was in Iláhábád.

The above five distichs run round the whole four sides of the thickness of the stone; but they are separated by two hemistichs in the *Mujtaṣṣ* metre, one in the centre of the north face and the other in the centre of the south face—

همیشه باد منور ز نور مهر الهه * سرپر حضرت سلطان سلیم اکبر شاه

May the throne of his Majesty Sultán Salím, son of Akbar Sháh, be for ever illuminated by the light of God's sun.

When the stone was subsequently brought to A'grah, Jahángir, perhaps ashamed of his rebellion, put the following distichs on the right and left pedestals (metre, *Muzá'ri*)—

چون شاه سلیم وارث تخت و نگین * بر تخت نشست و بست گیتی آئین
 شد اسم مبارکش جهانگیر چو ذات * از نور عدالت لقبش نور الدین

1. When Sháh Salím, as heir to the throne and the signet, sat on the throne under the rejoicings of the world,*
 2. His name, auspicious like his nature, became Jahángir, and his title from the light of his justice became 'the light of the faith' [Náruddín].

Mr. Carlleyle (Arch. Report IV, p. 135) says—"A hitherto unobserved portion of the inscription on this black 'marble' throne occurs in smaller letters below the inscription on the eastern side facing the river. It appears never to have been noticed hitherto, except by the Rev. Mr. Tribe, when chaplain of Agra, and by myself, and is engraved in the stone, while the rest of the inscription round the sides of the throne is in raised letters." Mr. Carlleyle reads—

اسم نامی پیش از جلوس شاه سلیم و بعد آن نور الدین محمد جهانگیر پادشاه غازی

The illustrious† name before the accession (was) Sháh Salím, and after it Náruddín Muhammad Jahángir Pádishah i Gházi.

Below it stands a distich, of which the second hemistich is in the *Mujtaṣṣ* metre; but Mr. Carlleyle's first hemistich makes no sense and has no metre—

بلند مرتبه بآواز نلک (؟) چو حکم الهه * سرپر شاه جهانگیر ابن اکبر شاه

* Mr. Carlleyle and the Agra Transactions translate "sat on the throne ministered laws to the world"; but *dín bastan* means 'to adorn a town and public rejoicings.'

† *Námí*, adj., illustrious.

The Hauz i Jaha'ngi'ri' in A'grah.

A description of Jahánger's *hauz*, or circular cistern, will be found in Arch. Report IV, p. 135. It is hewn out of one single stone, and is nearly five feet high, and 25 feet in circumference at the top. Mr. Beale writes regarding it as follows—"When I came to A'grah in 1843, this basin, or cup, or bath, called *Hauz i Jahángiri*, lay inside the fort of A'grah, and remained there till 1862, when it was removed to the Public Garden at A'grah, where it still remains. The Persian inscription round the edge consisted of five distichs, but most of the letters had fallen off. I only made out two with the greatest difficulty, and fortunately took a copy of them in 1848.* It appears from them that the Hauz was put up in 1019, or A. D. 1610.

The *tárikh* is very fine (metre, long *Hazaj*)—

پناه ملک دین شاه جهانگیر ابن اکبر شاه * شهنشاہی کہ از تدبیر او شد کار تقدیری
طلب کردند چون از خضر سال او خورد گفتا * نهان شد از خجالت زمزم از حوض جهانگیری

1. The refuge of the realm of faith, the world taking (*jahán-gír*) king, son of Akbar Sháh, (is) a king, through whose wisdom all affairs are settled.

2. When people asked the prophet Khizr for its date, genius said, 'Zamzam from shame hid itself from the Hauz i Jahángiri.'† A. H. 1019.

Akbar's Tomb at Sikandrah.

Sikandrah, or Bihishtábád, where Akbar lies buried, is too well known to need description (*vide* Mr. Keene's *Agra Hand-book*, p. 49). The following passage from the *Tuzuk* (p. 72), however, may be new to many. Jahánger says—

'On Monday, 17th Rajab 1017 [17th Oct. 1608], I went on foot on a pilgrimage to the Mausoleum of his late majesty. If possible, I would walk on my head and (sweep the road) with my eyebrows; for my august father walked, in order to obtain an heir, *viz.*, me, on foot from Fathpúr to Ajmír, a distance of 120 *kos*, in order to pray at the tomb of Khwájah Mu'in-uddín i Sijizí† i Chishtí. Hence, if I walk to my father's tomb, I shall after all not have done much. When I entered, I saw no building over the tomb such as I would approve of; for I had expected to see an edifice which travellers would pronounce to be unrivalled in the world. But whilst the

* *Vide* Miftáh uttawárikh, p. 220. They are no longer legible now.

† Zamzam is the name of the holy well near the Ka'bah in Makkah.

To get the *tárikh*, we have to subtract 'zamzam,' or 94, from *hauz i jahángiri*, or 1113. The subtraction is cleverly indicated by the phrase 'hid itself from the Hauz.'

The prophet Khizr (Elias) still lives, wandering about in the world and doing good, and especially giving the thirsty water to drink.

† *I. e.* from Sijistán, in which the village of Chisht lies. Sayyid Ahmad has *Sanjarí* for *Sijizí*. This reading—the shifting of a dot—is very common in inferior MSS.

building was being erected, Prince Khusrau rebelled, and I was obliged to go to Lâhor. The architects in the meantime went on building after their taste. Afterwards, various sums had to be expended, till the whole amount estimated for had been spent. They had been three or four years at work, when I ordered clever architects, who were assisted by experienced people, to build up several parts as I had before directed. Gradually a noble edifice arose, and a splendid garden was laid out round about the mausoleum. Gates of great height, with minarets of polished (*pardákhtah*) white marble were also made. In all, 15 lacs of Rupees, *i. e.* 50,000 tomâns as current in Persia, or 45 lacs Khânis, as current in Tûrán, were spent on the building. People called the building after me.'

Mírzá Aslâtûn, son of Mírzá Yûsuf Khân, was for some time Mutawallî of Akbar's tomb. He died at Sikandrah.*

Akbar's tomb, as is well known, is in a vault below the ground floor, and bears no inscription.† "The mortuary hall is nearly 38 feet square, and is surrounded by other chambers of smaller size containing tombs of less distinguished members of the Imperial family." Mr. Beale‡ mentions the tombs of Arâm Bânû and Shukrunnisâ Begam, both daughters of the emperor; but there are several others without name. Near Shukrunnisâ's tomb is the tomb of Sulaimân Shikoh, son of Shâh 'Âlam Pâdishâh, who died in A. H. 1253 (4th February, 1838).

The marble enclosure on the top of the building contains the *jawâb* of Akbar's tomb, made of single marble block, with the words *Allâhu Akbar* and *jalla jalâluhu* inscribed on the head and foot, and round about it are the "ninety-nine beautiful names of God" (*asmâ i husnâ*). The inscription on the walls of the enclosure§ makes no mention of the Prophet, and thus harmonizes with Akbar's religious views, whilst it at the same time completely refutes the story of Akbar's "conversion on the deathbed." It consists of 36 distichs (metre, *Mutaqârib*)—

بنام شهنشاه ملک قدیم * که ذاتش مبرا بود از عدم
همه پادشاهان روی زمین * از و عابد تاج و تخت و نگین
کند از عدم آشکارا وجود * بود ذات او مظهر عدل و جود
زلطفش که و مه طلبگار کام * بود درگش قبله خاص وعام
نگارند جوهر آب و خاک * طرازند گوهر جان پات

* *Xin Translation*, I, 347.

† *Vide Keene's Agra Hand-book*, p. 49.

‡ *Miftâh*, p. 211.

§ The common story is, that the inscription is taken from a poem composed by Shaikh Faizi and Abulfazl. The translation will show that this is impossible; besides Faizi died ten years, and Abulfazl three years, before Akbar.

دو عالم ز فیض ازل آفرید * بکے کرد پنهان و دیگر پدید
 به بخشیده آنگه سرای سپنج * بشاهان با افسر و تاج و گنج
 که از عدل ایشان شود روزگار * شکفته تر از باغ در نو بهار
 ره دایری را چو گیرند پیش * شناسند بیگانده را همچو خوش
 شیخ کوچنین زیست در روزگار * بود سایه ذات پیور دگار
 ز نه صد فزون بود شصت و دو سال * که شاه اکبر آن سایه ذرا لجال
 ببالای زربینه مسند نشست * که بر تخت او گشت افلاک پست
 جهان را بیدار است از عدل و داد * دل اهل عالم از و گشت شاد
 بر پایة تختش از هر گروه * شده جمع مردان صاحب شکر
 بهر ارفکنده نظر سوی خاک * بگوهر شده بهتر از جان پات
 گرفت بیک حمله ملکه بوزم * بایمای ابرو بداده به بزم
 چو لطف خدا لطف او عام بود * بهر کار چشمش بانجام بود
 بدرگاه او هر که برده پناه * چو اندیشه رفت ز ماهی به ماه
 چنان پر شد آوازه اش در جهان * که در دل نه گنجید راز نهان
 به پرداخت آن گونه روی زمین * که کرد آفرینش جهان آفرین
 بگیني دو افزون ز پنجاه سال * چنین کرد شاهی ز روی جلال
 چو از عدل آباد کرد این جهان * سوی آن جهان رفت روشن روان
 شد هفت کشور ازین پیش بود * کزین هشت جنت مستخرم بود
 به نزد خردمند هشیار دل * سرای است این عالم آب و گل
 منچو مهر از جوهر ته سپهر * که با کس بیایان نبردست مهر
 سپهر است پر کینه مهرش مدار * که با کینه مهر ناید به کار
 جهان است مانند موج سراب * ازان تشنه دل کی شود کاه یاب
 نه بست است پیمان بکس روزگار * که نشکست آن را بهنگام کار
 نماند به گیتی کسی جاودان * ز دست اجل کس نبردست جان
 چه خوش گفت آن کامل نکتہ سنج * که از گوهر دانش اندوخت گنج
 جهان ای برادر نه ماند بکس * دل اندر جهان آفرین بند و بس
 شد از عدل شاه اکبر کامگار * بسان بهشت برین روزگار
 جهان گشت خرم بدوران او * زمین و زمان شد بفرمان او
 و به دهر به مهر پیمان گسل * ز کین مهر او کرد بیرون زد دل
 ز قائم به مهری این جهان * روان شد سوی عالم جاودان
 روانش همیشه ز حق شاه باد * ازو عالم قدس آباد باد

1. In the name of the King of kings, the ruler of eternity, whose being is exempt from non-existence!
2. All kings on earth hold crown and throne and signal from Him.
3. Out of non-existence He produces existence; His nature reveals justice and generosity.
4. Great and small, in consequence of His goodness, are solicitous of His bounty; His throne is the cynosure of the elect and the people.
5. He designed the essence of water and of earth; he created the pure nature of the soul.
6. He created two worlds in His eternal kindness; one He concealed and the other He showed.
7. At the same time He bestowed the transitory world upon kings* together with the crown, the royal cap, and the treasury,
8. So that through their justice flourishing ages might surpass the bloom of a garden in spring;
9. And, whilst choosing the path of justice, they might look upon strangers as upon themselves.
10. A king who in his age lives in this manner, is indeed the shadow of God.
11. It was in 962,† that Sháh Akbar, the glorious,
12. Sat on the golden cushion, which on his throne became a lower heaven.
13. He adorned the world with his justice and equity, and the hearts of the people of the world became glad through him.
14. At the foot of his throne eminent men of all nations gathered.
15. If he cast in love a glance on the ground, its (the ground's) essence became better than that of the pure soul.
16. He took kingdoms in war on the first attack, and in the twinkling of an eye again gave them away at feasts.
17. As God's kindness, so was his kindness general; and his eye perceived the end of every affair.
18. Whoever took refuge at his throne, rose like thought (rises) from the fish to the moon.‡
19. His fame filled so entirely the whole world, that no one's heart could conceal a secret.§
20. He rendered the face of the earth so bright, that even the Creator praised him.
21. He thus ruled for more than fifty-two years on earth;
22. And because by means of his justice he had rendered this world prosperous, he went a bright spirit to the next world.
23. Before, he was a king of the seven climes; he has now subjugated the eight paradises.
24. In the eyes of wise men of sense, this perishable world is a Sarái.
25. Do not expect to find kindness in fate; for in the end fate shews kindness to no one.

* In allusion to Akbar's ideas of the divine right of kings.

† This should be 963.

‡ *Vide* above, p. 208, l. 6.

§ A hyperbole. If a man had a secret in his heart, Akbar's fame displaced the secret and took sole possession of the man's whole heart.

26. Fate is spiteful, do not love it ; for love is wasted on the spiteful.
 27. The world is like the wave you see in a mirage : it can never satisfy the thirsty heart.
 28. Fate has kept faith with no one, but breaks its promise at the time of need.
 29. No one remains for ever in this world, and no one has freed life from death's grasp.
 30. How well said the eloquent sage [the poet Sa'di], in the jewel of whose wisdom he* found a treasure,
 31. "The world, O brother, remains with no one : cling with thy soul to the Creator, and that is enough."
 32. But although the age through the justice of Shāh Akbar, the fortunate, became like the highest paradise,
 33. And although the world was happy in his time, and earth and age yielded to his rule,
 34. Unfeeling and word-breaking fate spitefully removed its love to him from its heart.
 35. However, fate's want of love led him to eternal life.
 36. May his soul for ever rejoice in his Creator, may the world of holiness brighten through him !

The wall surrounding the garden has four gates, but only the south gate is kept open. To both sides of the latter is a Persian inscription in Ṭagh-rā characters. Within the gate the following inscription is found (metre, *Mutaqárib*)—

بفرمان شاهنشہ ذو الجلال * کہ باشد شہنشاہیش بے زوال
 شد آراستہ آن چنان روزگار * کہ حیران شد اندیشہ ہوشیار
 بگیتی بفیض ازل پادشاہ * بود سایہ نور ذات الہ
 چو از دہر آن سایہ گرد نہان * فتد سایہ دیگر اندر جہان
 بدینسان بود تا سرانجام کار * بہ نزد خرد گردش روزگار
 زمانہ دگرگون شون ہر نفس * نگردد بیک گونه با هیچ کس
 فلک ربہ شاہ اکبر عرش گاہ * کہ از ہیبتش کوی گشتہ چو گاہ
 نشستہ چو بر تخت شاہنشہی * گرفتہ جہان فر ظل الہی
 فروزندہ افسر و تخت بود * کریم و رحیم و جوان تخت بود
 دل روشن و جان آگاہ داشت * جہان خورد و داد و گرفت و گذاشت
 بداغ جہان تخم نیکی بکشت * بر آن گرفت از ریانی بہشت
 روانش چو انوار خورشید و ماہ * فروزندہ بادا ز نور الہ

1. During the rule of the illustrious king—may his kingdom never wane !—
2. The world was so adorned, that the thoughts of the wise were confounded.

* Akbar, who liked Sa'di's *Gulistān*. *Ain Translation*, Vol. I, 103.

3. A king, by the eternal will of God, is in this world the shadow of the light of God's being.

4. When that shadow disappears from the world, another shadow falls on the world.

5. In this way, in the opinion of the wise, will ages revolve till the end of all things.

6. The world changes every moment, and remains for no one unchanged

7. When the divine *Sháh Akbar*, who is now in the highest heaven and whose terror changed rocks to chaff,

8. Sat upon the throne of royalty, the glory of God's shadow surrounded the earth.

9. He conferred lustre upon crown and throne; he was generous, merciful, and successful.

10. He was clear-sighted and wise: he enjoyed and gave away, he conquered and left the world.

11. He sowed the seed of goodness in the garden of the world, and reaped the fruit of it in the gardens of paradise.

12. May his soul shine like the rays of the sun and moon in the light of God!

The following three verses are on the northern side of the gate (metre, *Khaf'iy*)—

شاه اکبر ز روی دانائی * کرد طاهر ز دهر فانی دست

دولتش بود به زوال ازین * دل بدیدایی با زوال نبست

مرغ وحش چو بود طایر عرش * رفت و بر آشیان خویش نشست

1. *Sháh Akbar* in his wisdom washed his hands of the transitory world.

2. His power remained unchanged, because he did not cling to this changeable world.

3. As his spirit was a bird of the highest heaven, it went away and returned to its nest.

On the front of the entrance facing the north, Mr. Beale found the following inscription* in *Nasta'liq* characters (metre, *Muzá'irí*)—

طاقه که از رواق نهم چرخ برتر است * روشن ز سایه اش رخ تابنده اختر است

این طاق زیب نه فلک و هفت کشور است * از روضه منوره شاه اکبر است

1. This is a portico which is higher than the portico of the ninth heaven; its shadow illuminates the face of the shining star.

2. This portico is the ornament of the nine heavens and the seven climes: it is the shining Mausoleum of *Sháh Akbar*.

Mr. Keene mentions that Sikandrah was completed in the 7th year of Jahángir's reign, or A. D. 1612-13.

* Mr. Beale says (*Miftáh*, p. 209), "The inscription has never been read, because it is so high." He gives, however, the first verse. Mr. Keene says—"On the frieze round the great gateway are other poetical inscriptions in the Persian language, setting forth the praises of the monarch and the mausoleum." The writing, according to Mr. Keene, is by a calligrapher of the name of 'Abdul Haq Shírází.

Kachpu'rwá, near A'grah.

In the village of Kachpúrwa (کچھ پورہ), about a mile from the Rauzah of I'timád uddaulah, towards the east, on the left bank of the Jamuná, a dilapidated Masjid stands, which was built "by order of the emperor Humáyún" at the expense of the historian Shaikh Zainuddín of Khawáf,* Çadr of the empire and one of Bábar's literary friends. The inscription is of interest as it belongs to the first year of Humáyún's reign, as he ascended the throne on the 6th Jumáda I., 937.

شہ عرسہ دین محمد ہمایون * کہ بنیاد قدش بود فرق گردون
بقرمان عالی بحکم رفیعش * مرتب شد این فرش و این سقف میدون
بقاریخ انعام این بیت .. شہ عرسہ دین محمد ہمایون

1. The king of the domain of faith (is) M u h a m m a d H u m á y ú n, the basis of whose worth is the vortex of the revolving heaven.

2. At his high command and exalted decree, this auspicious floor and roof were made.

3. As date of the completion of this house...[one word illegible], 'The king of the domain of faith, M u h a m m a d H u m á y ú n.' A. H. 937 (A. D. 1531.)

The writer and composer is Saháb-ulhádf.

A second inscription is on the left hand wall (*Rubá'í* metre)—

این بقعہ بود چون دل صوفی صافی * انکار صفای اوست بے انصافی
چون یافت بسعی زین خافی انعام * تاریخ شدش بسعی زین الخافی
آمرزش یابد آنکہ رازی را یاد کند قابله و راقعہ میباب

1. This religious edifice is pure like the heart of a Sáfí. To deny its purity were injustice.

2. As it was completed at the expense of Zain of Kháf, its date lies in the words 'at the expense of Zain the Kháfí.'

Pardoned may be he who remembers (two words illegible). The composer and writer is Saháb.

A description of this mosque and a plan will be found in the Arch. Report, IV, p. 100 and Pl. xii.†

Zainuddín of Kháf, or Khawáf, is mentioned in the following extract from Akbarnámah (Lucknow edition, I, p. 147)—

* The meaning of the word سعي clearly shews this. Regarding the town of Khawáf, or Kháf, *vide* Ain Translation, I, 445.

† Mr. Carleyle's reading of the inscription makes no sense. I have, therefore, given Mr. Beale's reading. Mr. Carleyle has not recognized in زین the name of the builder, and instead of reading Zain [uddín], he reads zín, 'by this' and translates 'Khawáf' by 'veiling.'

"Of the men of learning whom his late Majesty, the emperor Bábar, honored with his personal friendship, were the following—(1) Mir Abul Baqá, who reached a high degree of knowledge in philology and philosophy. (2) Shaikh Zain Çadr, great-grandson of Shaikh Zainuddin Khawáfí,* who was well up in science, a smart critic, acquainted with poetry and prose writing. He was always in the emperor's company, and was raised by the emperor Humáyún to the rank of Amír. (3) Abul Wájid, poetically styled 'Fárigihí,' the maternal uncle (*khál*) of Shaikh Zain, an agreeable and humorous companion, fond of making verses. (4) Sultán Muhammad Kosah ('the bald'), witty, and well acquainted with poetry, who had been a companion of the renowned Mir 'Alí Sher. (5) Mauláná Shiháb, the riddle writer, poetically styled 'Haqíri,' well acquainted with science, and no mean poet. (6) Mauláná Yúsuf Tabib, whom the emperor called from Khurásán, an excellent man. (7) Surkh Widái Kuhnah, a little known poet, who wrote poems in Turkish and Persian. (8) Mullá Baqáí, a distinguished poet, who wrote in honor of Bábar a *Magnawí* in the metre in which Nizámí had written his '*Makhzan*.' (9) Khwájah Nizámuddin 'Alí Khalifah,† a wise counsellor and faithful friend, well acquainted with medicine. (10) Mir Darwish Muhammad Sár-bán, the pupil and favourite of Náçiruddín Khwájah Ahrár, a much-liked companion and confidant of the emperor. (11) Khwánd Mír, the historian, learned and agreeable, and famous for his historical works, as the '*Habib ussiyar*,' the '*Khuláçat ul-Akhibár*,' the '*Dastúr ul-Wuzará*,' &c. (12) Khwájah Kalán Beg, a great Amír and friend of the emperor, a man of great tact and eminent acquirements. His brother Kichak Kíwájah was holder of the signet and a confidant of the emperor. (13) Sultán Muhammad, of the Duldai clan, a great Amír and a pleasant companion."

Of greater importance is the following passage which I translate from Badáoní (I, p. 471):—

"Another (man of renown) was Wafáí, the *nom-de-plume* of the well-known Shaikh Zainuddin Kháfí, who held the post of Çadr under Bábar. He built a Mosque in A'grah and a Madrasah, which lie on the other side of the Jamuná. He was a talented man, and eminent in riddles, history, extemporaneous verse making, in poetry, all other minor branches of poetry and prose, and in letter writing. * * * * He wrote a history on the conquest of Hindústán (by Bábar) and the extraordinary circumstances that accompanied it. He displays in it his power over the language. He died in the neighbourhood of Chanár in 940 [A. D. 1533-34], and was buried in the Madrasah he had built."

The History written by Zainuddin Kháfí is mentioned by Prof. Dowson in Elliot's *Historians*, No. V, pp. 288 to 292. Badáoní's remark proves

* Regarding him *vide* A'in Translation, I, p. 592a.

† *Vide* A'in Translation, Vol. I, p. 420.

the correctness of Prof. Dowson's identification and supplies the biographical particulars which were wanting in Elliot's MS.

Neither Mr. Beale nor Mr. Carlleyle mentions Zain's Madrasah.

In front of Shaikh Zain's mosque, Mr. Beale saw several tombs. He copied the following inscriptions.

نوبسته عقیقه ز گلستان جهان برفت • وز شاخ سار عمر علی نو جوان برفت
باشد هزار حیف که نقد حیات ما • بردل نهاده داغ فراق از جهان برفت
الحکم لله وفات عالمجناب مرحوم خواجه خواجه معین الدین احمد
رمضان سنه ۹۸۶ *

The first two lines require revision, and I have not translated them. The last line is—

To decree belongs to God. The distinguished and pardoned Khwājah [Alī, son of] Khwājah Mu'inuddīn Ahmad died on the... Ramazān, 968 [July, 1560].

This must have been a younger son of the Khwājah Mu'inuddīn Ahmad, one of Akbar's grantees, whose biography is given in my *A'in Translation*, I, 434. Mu'in was governor of A'grah in 1560.

On another tomb, Mr. Beale saw the following (metre, *short hazaj*)—

زیزدان هدیغه بود آن نکونام • ازینسان تحفه خواندش
چو بوده ذکر نامش بر زبانم • تسلی بخش جان ناتوانم
گرفتم سال از تکرار نامش • بتاریخ شهادت *

1. This person of good fame was a present from God; and for this reason every .. called him 'Tuhfah' ['a present'].

2. As the mention of his name, which brings consolation to my weak spirit, was on my lips,

3. I obtained from twice repeating his name the date of his death.

Hence we have to double the word *tuhfah*, i. e. $2 \times 493 = 986$ A. H., or A. D. 1578.

Sarjīpu'r, near A'grah.

Mr. Beale says—'There was a Sarāi in the village of Sarjīpūr (سرجی پور) in Madiā Kaṭrah (مدیا کترو) about $2\frac{1}{2}$ miles from the fort of A'grah. A few years ago it was demolished, and the material was carried away to build the present District Jail of A'grah. The gate of the jail was built with the material taken from the gate of the Sarāi. The inscription on the top of the gate still remains as before.'

لا اله الا الله بسم الله الرحمن الرحيم محمد رسول الله
 در سنه بیست و سیوم محمد شاه پادشاه غازی اطلال الله ملکه و سلطانه در سنه یکهزار
 و یکصد و پنجاه و چهار هجری بنده میروجه الدین خان مخاطب به میر جلال
 الدین خان ولد میر جلال الدین خان مرحوم اکبر آبادی ابن میر سید محمد ابن
 سرای را برای آرام مسافرتین بنا نموده بهر آئنده و رونده جسد الله بدعاء خیر یار
 نمایند و السلام علی محمد و آله و اصحابه اجمعین باهتمام سدا سیوناراین *

In the name of God, the merciful, the element! There is no God but Allah; Muhammad is Allah's Prophet. In the 23rd year of the reign of Muhammad Shāh Padishāh i Ghāzī—may God lengthen his kingdom and rule!—in 1154 A. H. [A. D. 1741-2], the slave Mīr Wajīh uddīn Khān, whose title is Mīr Jalāluddīn Khān, son of the late Mīr Jalāluddīn Khān, of Agra, son of Mīr Sayyid Muhammad, built this Sarāi, for the comfort of travellers, for the future and the present a pious deed done to God. May people remember (the builder) with a pious wish! And blessings upon Muhammad and his house and all his companions!

Under the superintendence of Sadā Shiv Nārāyan.

Nārnaul, S. W. of Dillī.

Mr. Delmerick has sent me a reading of the following inscription from the tomb of Ibrāhīm Khān Sūr, the grandfather of the emperor Sher Shāh.

عمارت که کرد ار کسی از تو پرسد * جوابش بده گرتودانی رازی
 بنا کرد این گنبد عرش پایه * شه مملکت شیر سلطان غازی
 سر سوران مالک هفت کشور * که تیغش ز برق جهان بود بازي
 فرید حسن سور بن ابرهیم * بقومود بر قبر جد خلد سازی
 چوپرسی ز من گار فرما که بودش * ابا بکر بن شیخ احمد نیازی
 نیازی بتمیم تخصیص کندي * بدین ذات پاکش بود سرفرازي

1. If any one asks you who made this building, give him the answer if thou knowest the secret:

2. This dome, whose foundation is the highest heaven, was built by the king of the country, Sher [Shāh], the victorious ruler,

3. The chief of chiefs, the lord of the seven realms, whose sword surpasses the flash of the lightning.

4. Farīd,* son of Hasan Sūr, son of Ibrāhīm, ordered a beautiful vault to be built over the grave of his grandfather.

5. If you ask me who was the superintendent, (I say it was) Abā Bakr, son of Shaikh Ahmad, the Niyāzī.

6. If I use the general term, I may call him a Niyāzī, but if I use the special term, I must call him a Kindī, and this reflects honor on his pure character.

* Sher Shāh's name was Farīduddīn.

The inscription does not seem to be complete, and in the fourth line the metre is violated. The histories do not mention the year in which Ibráhim Khán Súr died; but that he died at Nárnaul is known from the Hon'ble E. C. Bayley's translation of the *Tárikh i Sher-Sháhí* in Dowson, IV, p. 309.

I take the following remarks on Nárnaul from my geographical notebook :

Ná r n a u l belongs to the old district of Dhundhotí,* which corresponds almost entirely to the tract which Muhammadan historians call Mewát. The latter term has perhaps a wider extent, as it includes the old Sirkárs of Rewári, Alwar, and Tijárah, being bounded in the north-west by Bikanír, in the south by Amber-Jaipur, and in the east by the Súbahs of Ágrah and Dihlí. Sirkár Nárnaul itself consisted at Akbar's time of 16 mahalls, viz. Bábái, Barodah Ra'ná, Chál Kalánah (Kalyánah), Jhújyún, Singhánah-Udaipur, Kanaudha, Kot-Putli, Kánorí, Khandelá, Khodáná, Lápotí, the Dáman i koh, Nárnaul, and Narhar. The town of Nárnaul itself, says Abul Fazl, has a stone fort, and near it is an intermittent spring. South-west of it lies Bághor, founded by Bach Deo.† The Sirkár had several copper-mines, especially at Bábái, Singhánah-Udaipur, Bhándarah in Kot-Putli, and Ráipur in the Dáman i Koh, with copper mints at Singhánah and Ráipur.‡ The district contained numerous sayurghál, or rent-free, tenures. Thus in Mahall Nárnaul itself, the area of which is given by Abul Fazl at 214,218 big'ahs and the revenue at 147,830 Akbarsháhí Rupees, the rent-free lands are put down at Rs. 13,754. The Mews, or Mewátis, the inhabitants of Mewát, are frequently mentioned by early Muhammadan historians as turbulent; and the emperor Balban especially had continually to wage war with them, often with doubtful success. The earliest settlement of the Muhammadans at Nárnaul itself, which legends ascribe to Shaikh Muhammad Turk, provoked hostilities, which culminated in A. H. 642, or A. D. 1245, in the massacre at the 'Id festival of all Muhammadans that lived in the town. Shaikh Muhammad Turk, too, fell a victim, and his life and miracles and meritorious death still attract pilgrims to the tomb of the Nárnaul martyr.

But Nárnaul is not mentioned by Dihlí historians before 814 (A. D. 1411), when Khizr Khán plundered the country, and a few years later, in 838 (A. D. 1424-35), when Nárnaul was given to Sidh Pál and Sadhāran K'hatri, the murderers of Mubarak Sháh, as jágir. During the reign of the Lodís, Ibráhim Khán Súr obtained a few villages as jágir for the maintenance of forty horses. He died in Nárnaul, as has been men-

* Elliot, *Races of the N. W.*, by Beames, I, 82.

† Cunningham, *Arch. Report*, I, 154.

‡ Thomas, *'Chronicles'*, p. 416.

tioned above. When his grandson Sher Sháh drove Humáyún from India, Nárnaul was held by Majnún Khán Qáqshál. He was besieged by Háji Khán, one of Sher Sháh's best officers; but through the exertion of Rájá Bihári Mall of Amber the town was spared, and Majnún Khán was allowed to evacuate the fort and retreat with his soldiers to the west. Háji Khán occupied Nárnaul, and held it during the reigns of Sher Sháh's successors. He was driven from it, in the first year after Akbar's accession, in 963 (A. D. 1556), by Tardí Beg, Akbar's governor of Dihlí.* In the end of the 8th year of Akbar's reign, Nárnaul, which had been included in the *khalsa* lands of the empire, was given to Shujá'at Khán as *jágír*.† He left his son Qawim Khán as commandant of the fort, whilst Mír Gesú was the imperial collector. The town was suddenly attacked and plundered by the fugitive Sháh Abul Ma'áli, Humáyún's favorite, upon whose head Akbar had set a high prize. Qawim Khán fled, and Mír Gesú was killed. On the approach of an imperial detachment, Sháh Abul Ma'áli fled with the treasure to Hiçár Firúzah.

The next event of importance, mentioned in the histories, is the Nárnaul rebellion, which broke out in the beginning of the 15th year of Aurangzib's reign, in 1082 A. H., or A. D. 1671, caused no doubt by the imposition of the *jizyah* and the emperor's crusades against Hindú temples. Kháfi Khán (II, 252) gives the following account.

'In Nárnaul District and other places in Mewát, there was a sect of Hindús, who called themselves 'Satnám s.' They are also known as the Múndiah sect, and consisted of four or five thousand families. Although they dressed like faqírs, they carried on trade and agriculture, or lived as petty merchants. According to their tenets, they wished to obtain the rank of 'men of fair fame,' and this is the meaning of the word *sat-nám*. They were scrupulously honest in their dealings; but if any one oppressed them, they would not suffer it, and hence they used to go about armed. About the time that Aurangzib returned from Hasan Abdál, it happened that a peasant in the neighbourhood of Nárnaul got into a quarrel with one of the collector's peons, who had been sent there to watch the harvest. From words it came to blows, and the peon killed the peasant. Other peasants collected, attacked the peon, and left him lying lifeless on the ground. The collector then sent a number of peons to bring the peasants to account; but the Satnám s. mustered in force, wounded several of the peons, and drove them away. Kár Talab Khán,‡ the faujdár of Nárnaul, sent the collector a detachment of horse and foot; but the Satnám s. put them to flight. The Faujdár now collected the troops of the district, got assistance from the

* *Xin Translation*, I, p. 319.

† *Akbar-námah*, II, 252, and *Xin Translation*, I, 371.

‡ The *Maás. 'Alaagiri* (p. 115) calls him Táhír Khán.

zamíndárs of the neighbourhood, and moved at last personally against the rebels. He was, however, defeated in several engagements and had to withdraw, when the town of Nárnaul was occupied by the Satnáms, who made immediate arrangements to collect the taxes and establish thánahs all over the district.

‘When the emperor returned to Dihlí, he heard of the rebellion, and sent off several detachments, every one of which was routed, so much so that the rumour spread that neither sword nor arrow nor bullet could hurt a Satnám, whilst every arrow and bullet of the rebels killed two or three imperialists. In fact, every one believed that the Satnáms practised witchcraft. The most extraordinary things were related of them. Thus it was said that they possessed an enchanted wooden horse upon which a woman rode, and the horse used to go like a live horse in front of their vanguard. Matters went so far that Rájás of renown and Amírs experienced in warfare had to be despatched against them with strong detachments; but the soldiers were so unwilling to march on, that the rebels came within sixteen or seventeen *kos* of Dihlí. Several zamíndárs and mean Rájputés joined them to escape taxation, and the revolt assumed such dimensions, that the emperor left the palace and ordered the tents to be pitched outside the capital. He also wrote formulas of blessings and amulets with his own hands, and had them sewn on the flags and banners, and then sent the soldiers against the rebels. At last, after great exertions on the part of Rájá Bishn Singh,* Hámíd Khán (son of Murtazá Khán), and other intrepid Amírs, several thousands of the rebels were killed; the rest dispersed, and the rebellion ended.

‘But as so many zamíndárs had taken part in the rebellion, the whole Súbah of Ajmír and even the neighbourhood of Agrah were unsettled; and the tents having been pitched outside the capital, the emperor resolved to perform a pilgrimage to the shrine of Mu’ínuddín Chishtí at Ajmír, intending at the same time to punish the refractory zamíndárs. But before leaving, he gave orders to levy the *jizyah* from the Hindú population of the capital, as well as from the Hindús in all other Súbahs. When the orders were published, the Hindús—you might have counted them by lacs—collected below the window where the emperor used to show himself to the people, and loudly bewailed their poverty and cried loud to get the order rescinded; but his Majesty paid no attention to the clamour. But when, on the next Friday, the emperor went from the palace to the Jámí’ Mosque to say prayers, the Hindú money-changers, cloth merchants, and other tradesmen had assembled in such numbers as to block up every street. The emperor waited an hour, thinking the people would let him pass; at last he gave orders to move on, and several people were trampled to death by the elephants or

* The chief commander, however, was Ra’dandáz Khán (the ‘thunder-thrower’), an officer in Aurangzib’s artillery.

ridden over by the horses. For several days, the Hindús assembled in large numbers; but at last they gave in and paid the *jizyah*.*

Some of the dispersed Satnáms, adds the author of the *Tazkirah i Saláti-i Chaghtái*, had the boldness to enter Dihli; and when the report came to the ears of the emperor, he ordered the Superintendent of Police (*shihnah*), Sidi Fúlád Khán, to hunt them down. About seventy or eighty had taken possession of some ruined buildings in the Habshípúrah Quarter. They defended themselves for several hours, but were at last all killed, and Sidi Fúlád hung their dead bodies on the trees round about the town. He received the thanks of the emperor, and the Satnáms were heard of no more. Ra'dandáz Khán received the title of Shujá't 'Alí Khán, was promoted and got a kettledrum.

During the reign of Sháh 'Álam Bahádur,* Aurangzib's son, the rebellion in Súbah Ajmír continued, and Sayyid Ghairat Khán, Faujdár of Nárnaul, was killed.

In the 6th year of Farrukh Siyar's reign, A. H. 1129, or A. D. 1717, Çalábat Khán was Faujdár of Nárnaul.

The biographical works on Muhammadian Saints and Mr. Beale's *Miftáh ut-tawárikh* mention the following men of note—(1) Shaikh Muhammád Turk, who had come from Turkistán to Nárnaul. As mentioned above, he was killed in A. H. 612, or A. D. 1244-45. (2) Shaikh Ahmad Majd Shaibání, a holy man, born at Nárnaul. He died at Nágor in 927, or A. D. 1521. (3) Shaikh Ilahdín Majzúb, a faqír, died 946, or A. D. 1539. (4) Shaikh Hamzah, of Dhársú, 3 kos from Nárnaul; died in 957, or A. D. 1550. (5 and 6) Shaikh Ismá'il, a learned man; and his younger brother Shaikh Nizám, a saint of renown, died in 997, or A. D. 1589 (*Áin Translation*, I, p. 538; and *Badáoní*, III, 26). (7) Walí Muhammad, died 5th Shawwál, 1057, or 1647. (8) Sayyid Ni'matullah, who left Nárnaul for Rájmahall, where he was much honored by Prince Shujá'. He lived at Firúzpúr, east of Rájmahall, and died there in 1077 or 1080, A. D. 1666 or 1669.

Nárnaul is also the home of the family to which the Hindústání poet Afsos belongs. He says in the preface to his poems that he traces his descent from Imám Ja'far Çádiq. Sayyid Badruddín, brother of Sayyid 'Alamuddín 'Hájí Khání,† one of the poet's ancestors came from Khawáf in Khurásán to Nárnaul. Sayyid Ghulám Muçţafá, grandfather of the poet, moved during the reign of Muhammad Sháh from Nárnaul to Dihli, where Sayyid 'Alí Muzaffar Khán, Afsos's father, entered the service of Amír Khán. Mir Sher 'Alí, known under the poetical name of Afsos, was born at Dihli.

* Called 'Bahádur Sháh' in European histories.

† This seems to mean that he was in the service of Hájí Khán, Sher-Sháh's officer, who, as mentioned above, was many years in Nárnaul. Regarding Afsos, vide also Sprenger's Catalogue of Oudh MSS., pp. 198, 597.

Mr. Blochmann then mentioned that Major-General Cunningham, C. S. I., Director-General of the Archaeological Survey of India, had sent to the Society another batch of Muhammadan inscriptions, *viz.* four from Burhánpúr, and seven from Asirgarh, for publication. Among them was a Sanskrit Inscription, a free translation of the Arabic inscription attached to the Jámi' Mosque of 'Adil Sháh II. Fárúqi, of A. H. 997.

The following papers were read—

1. *Notes on Sháh Ismá'il Gházi, with a sketch of the contents of a Persian MS., entitled "Risálat ush-Shuhadá," found at Kántá Dúár, Rangpúr.*—By G. H. DAMANT, B. A., C. S.

(Abstract.)

There are four Dargáhs, or shrines, in Rangpúr, erected to the memory of Sháh Ismá'il Gházi. They are all situate a few miles to the north-east of G'horág'hát, in thánah Pírganj. The principal one is at Kántá Dúár. About three miles west is another at a place called Jalá Maqám. These two dargáhs are under the care of the same faqír, who has a large jágir and claims to be descendant of one of the servants of Ismá'il, who came with him from Arabia. The head of the saint is said to be buried at Kántá Dúár, and his body at Madáran, in Jahánábád, west of Húglí.

Mr. Damant found the MS. in the possession of the faqír of Kántá Dúár. He assured him it had been in the possession of his family for many generations, but he was unable to read it, and was quite ignorant of the contents. The short facts as given in the MS. are, that in the time of Bárbak Sháh, Ismá'il came to Gaur, where he gained the favour of the king by building a bridge or embankment across the great marsh, east of Gaur. He was then sent against Gajpatí, king of Madáran, or Orísá, whom he utterly defeated, and lastly, he fought two battles with Kámesar, king of Kámrúp. The king finally tendered his allegiance, and consented to pay tribute, though it does not appear that the country was regularly occupied by the Musalmáns. The Hindú governor of G'horág'hát appears to have been envious of Ismá'il's fame, and falsely charged him with entering into an alliance with the king of Kámrúp. A force was sent against Ismá'il, and he was beheaded in the year 878, which would bring his death to the end of the reign of Bárbak Sháh.

The account given in the MS. corresponds most strangely in many particulars with the legend which Mr. Blochmann heard at Húglí (*see Asiatic Society's Proceedings, April, 1870, page 117*). In that legend, Ismá'il is said to have invaded Orísá with success, and to have been falsely accused by a Hindú of attempting to set up an independent kingdom at Madáran, and on this false charge to have been beheaded by order of the king. We

may, I think, on this double authority, take these two statements to be established facts.

The only difference between the two legends is this, that the Húgli legend refers the whole to the reign of Husain Sháh, *i. e.* about thirty or forty years later.

The history was written by Shaikh Pír Muḥammad Shattá'ri in 1042, or A. D. 1633, during the reign of Sháljahán.

Mr. Damant's essay and the text of the MS. will appear in No. III. of Pt. I. of the Journal for this year.

2. *On the Temple of Jaysággar, Upper Ásám.*—By J. M. FOSTER, F. S. A., Názirah, Ásám.

(Abstract.)

This paper is accompanied with two photographs of the Jaysággar Temple, several plans, and plates of the architectural ornaments. The temple was built by Rudra Singh, *alias* Chuckungpha, in memory of the heroic death of his mother. Rudra Singh, whose father Ghadhádhār Singh had been the last Buddhistic king of Ásám, adopted the Hindú faith from the commencement of his reign in 1695, A. D.

Mr. Foster's essay with several plates will be published in Journal, Pt. I., No. IV., for 1874.

Mr. Blochmann drew the attention of the members to some of the architectural ornaments, many of which were Muhammadan in design, especially the winged fairies in Course F., and the fairy on horseback, which looked exactly like the pictures he had seen in MSS. of the Prophet when sitting on the 'Buráq' and ascending to heaven.

3. *On the Supposed Identity of the Greeks with the Yavanas of the Sanskrit Writers.*—By RA'JENDRALÁ'LA MITRA.

(Abstract.)

The author reviews the opinions of various Sanskrit scholars on the meaning of the word 'Yavana.' Whilst several of them attribute to it, more or less distinctly, the meaning of 'western foreigners,' Dr. Kern in his preface to the Brihat Sañhitá maintains that 'Yavana' signifies 'a Greek and a Greek only.' It is, therefore, necessary that the whole question should be re-examined. For this purpose, the writer has collected passages from the Egyptian, Hebrew, Assyrian, and pre-classic Greek, where the forms Unin, Jávan, and Ionian occur, and he shews that in these passages, as also in the Io legend, the word 'Ionian' refers to a mixed population or 'ancient Eurasians'. He then enumerates the passages from Páñini, Manu, the Mahábhárata, Vishnu Purána, the Vis'wamitra legend in the Rámáyana, Karna Parva, and many other Sanskrit works, where the Yavanas are mentioned. He also discusses the similar passages

in the As'oka edicts, and shews that of all Greek kings, Alexander the Great not excluded, only one, *viz.* Antiochos Theos, *whose dominions reached to the Indus*, is called a Yavana, or Yoná. Further, he proves that the Hindus did not borrow a single astronomical term direct from the Greeks, and that the opinion advanced by Weber and Kern on the existence of Sanskrit translations of astronomical works written by four Greek writers is untenable, whilst the list of words common to Sanskrit and Greek, given by Weber, proved the existence of no influence of Greek on Sanskrit.

The only conclusions which would be consistent and tenable are—

1st. That originally the term Yavana was the name of a country and of its people to the west of Kandahár—which may have been Arabia, or Persia, or Medea, or Assyria,—probably the last.

2nd. That subsequently it became the name of all those places.

3rd. That at a later date it indicated all the casteless races to the west of the Indus, including the Arabs and the Asiatic Greeks and the Egyptians.

4th. That the Indo-Greek kings of Afghánistán were also probably indicated by the same name.

5th. That there is not a tittle of evidence to show that it was at any one time the exclusive name of the Greeks.

6th. That it is impossible now to infer from the use of the term Yavana the exact nationality indicated in Sanskrit works.

The essay will appear in No. III, of Part I of the Journal for 1874.

The Hon'ble E. C. Bayley made some remarks on the subject. Without for the present questioning Bábu Rájendralála Mitra's general conclusions, and while fully admitting that the word 'Yavana' was often used in a vague sense and might be rendered as 'foreigners,' or at any rate 'western foreigners,' he yet demurred to the conclusions drawn from As'oká's inscriptions. It seemed to him that the natural inference from the facts was directly opposite to that which in the opinion of the writer flowed from them, and that in this instance at least, if in no other, the term 'Yavana' or rather 'Yona,' could hardly be rendered otherwise than a 'Greek or a 'Grecian.'

4. *On Embolocephalus ceratophthalmus—the type of a new genus and species of Isopod Crustaceans.*—By JAS. WOOD-MASON.

This paper will be published in the Journal, Part II, No. 4, 1874.

5. *Some Ornithological Notes and Corrections.*—By W. E. BROOKS, C. E.

This paper will be published in the Journal Part II, No. 4, 1874.

6. *Descriptions of new species of Helicidae of the genera Helix and Achatina from the Khasi Hills and Manipur.*—By Major H. H. GODWIN-AUSTEN, F. G. R. S.

This paper will be published in Journal Part II, No. 2, 1875.

The meeting then was adjourned.

LIBRARY.

The following additions have been made to the Library since the meeting held in August last.

Presentations.

* * * Names of Donors in Capitals.

The Journal of the Royal Asiatic Society of Great Britain and Ireland. Vol. VII, Part I.

ASIATIC SOCIETY OF GREAT BRITAIN.

Philosophical Transactions of the Royal Society of London for 1873, Vol. 163, Parts I, and II.

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J. N. Hennessey: Note on the Periodicity of Rainfall.—*W. Roberts M. D.*: Studies on Biogenesis.—*Prof. Osborne Reynolds*: On the Refraction of Sound by the Atmosphere.—*N. Moseley*: On the Structure and Development of *Peripatus capensis*.—*J. Tyndall*: Further Experiments on the Transmission of Sound.

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Proceedings of the Institution of Mechanical Engineers of Birmingham, for October 1873, and January and April 1874.

C. C. Walker: Description of a Wrought Iron Construction of Observatory for maintaining equality of internal and external temperature.—*A. B. Brown*: On Hydraulic Machinery for steering, reversing and discharging cargo &c., in steamships.—*H. M. Morrison*: On the Transmission of Water Power by Turbines and Wire Ropes.

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J. A. Ewing and J. G. Macgregor: On the Electrical Conductivity of certain Saline Solutions, with a Note on the Density.—*J. Dewar and I. G. M'Kendrick, M. D.*: On the Physiological Action of Light.

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J. Anderson: On the Osteology and Dentition of *Hylomys*.—*Prof. G. J. Allmann*: Report on the Hydroids collected during the Expeditions of H. M. S. 'Porcupine.'

THE ZOOLOGICAL SOCIETY OF LONDON.

The Anatomy of the Lymphatic System. By Dr. E. Klein.

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R. Appuhn: On the Analysis of a Meteoric Stone, and the Detection of Vanadium in it.—*A. Schrauf*: Schröckingerite, a New Mineral from Joachimsthal.—*R. W. Van Gorkom*: Cinchona Cultivation in Java.—*J. Kolbe*: Amount of Real Acid in Sulphuric Acid of various densities.—*H. Caron*: New Method of Tempering Steel. Regeneration of Burnt Iron.—*F. L. Sonnenschein*: New Test for Blood and Examination of Blood Stains.—*F. Fischer*: Contamination of a Well by the waste from a Gaswork.—*A. F. Hargreaves*: On the Spontaneous Combustibility of Charcoal.—*C. R. A. Wright and J. Lambert*: On Cajuput Oil. On the action of Pentasulphide of Phosphorus on Terpenes and their Derivatives.

Geographical Magazine. Edited by C. R. Markham, C. B., F. R. S.

THE EDITOR.

Proceedings of the Royal Geographical Society. Vol. XVIII, No. III.

Indian Government Mission to the Atalik-Ghazi, Letters from Mr. T. D. Forsyth.—*Watson*: Journey in Yezo in 1873, and progress of Geography in Japan.—*Dilks*: Valley of the Ili and the Water System of Russian Turkistan.

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Memoirs of the Peabody Academy of Science Vol. I. Nos. I, II, III.
First to Fifth Annual Reports of the Trustees of the Peabody Academy of Science.

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THE AUTHOR.

First, second, and third Annual Reports of the United States Geological Survey for 1867, 1868, 1869.

Report of the Chief Signal Officer to the Secretary of War (United States) for the year 1872. (2 copies.)

Synopsis of the Acrididae of North America, by Cyrus Thomas.

Contributions to the Extinct Vertebrate Fauna of the Western Territories (United States), by Joseph Leidy.

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Hübischmann: Avestastudien.—*Haug*: Ueber eine Arabische Siegelinschrift aus vorchristlicher Zeit.—*Ethel*: Firdús als Lyriker.—*Herm. v. Schlagintweit-Sakün-lünski*: Reisen in Indien und Hochasien.—*Plath*: Das Kriegswesen der alten Chinesen.—*L. A. Buchner*: Ueber die Löslichkeit der arsenigen Säure im Wasser.—*Erlekmeyer*: Ueber die Bestandtheile des Arnicawassers und des ätherischen Arnicaöles.—*Vogel*: Ueber das Verhalten der Milch zum Lakmusfarbstoff.

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La Langue et la Littérature Hindoustanie, by M. Garcin de Tassy.

THE AUTHOR.

Annual Report of the Sanitary Commissioner for the Central Provinces, for 1873.

Report on the Forest Administration of the C. Provinces, for 1873-74.

Report on Vaccine Operations in the Central Provinces, for 1873-74.

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CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

Report on the Sanitary Administration of the Panjáb, for 1873.

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Report on Public Instruction in the Madras Presidency, for 1872-73.

THE GOVT. OF MADRAS.

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Report on the Calcutta Medical Institutions, for 1873.

Specimens of Languages of India, including those of the Aboriginal Tribes of Bengal, the Central Provinces, and the Eastern Frontier.

Correspondence relating to the Famine in Bengal and Behar, 1873-74, together with Minutes by Sir Richard Temple, K. C. S. I.

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Vaishnavá-vrata-Dina-Nirnaya. By Navadvipachandra Vidyaratna Goswami.

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Instructions for the Electrical Testing of Lines and Offices. Part III, Section I. By Louis Schwendler.

THE AUTHOR.

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Exercises in the Lushai Dialect. By Captain T. H. Lewin.

THE AUTHOR.

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THE AUTHOR.

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THE AUTHOR.

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THE AUTHOR.

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THE AUTHOR.

Purchase.

The Annals and Magazine of Natural History, 80 Vol. 14.

W. T. Blandford: Description of new Reptiles and Amphibia from Persia and Baluchistan.—*Albert Günther*: A contribution to the Fauna of the River Tigris.—*M. C. Rohir*: Observations on the Fecundation of the Batrachia Urodela.—*H. J. Carter*: On the Nature of the Seed-like Body of *Spongilla*, on the Origin or Mother Cell of the Spicule, and on the Presence of Spermatzoa in the Spongider.—*A. G. Butler*: Descriptions of two new species of *Fulgora* from India.—*Arthur Viscount Walden*: Descriptions of some new Species of Birds.—*Dr. Richard Grief*: *Pelomyxa palustris*, a freshwater Amœboid Organism.—*Arthur Viscount Walden*: On *Megapodius trinkutensis*, Sharpe.—*M. A. Giard*: On the structure of the Caudal Appendage of some Ascidian Larvæ. On Parthenogenesis in Ferns.—*Prof. O. C. Marsh*: Small size of the Brain in Tertiary Mammals.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science, Nos. 313 to 316.

James Dewar: On the Physical Constants of Hydrogenium.—*F. Kohlrausch*: Determination of the Absolute Value of the Siemen's Mercury Unit Electrical Resistance.—*Dr. W. B. Carpenter*: On the Physical Cause of Ocean Currents.—*F. Kohlrausch*: A Variation—Barometer.—*J. A. Fleming*: On the new Contact Theory of the Galvanic ball.—*Thomas T. P. Bruce Warren*: On Warren's Method of finding Faults in Insulated Wires.—*Oliver Heaviside*: On Telegraphic signalling with Condensers.—*James Croll*: On the Physical Cause of Ocean-Currents.—*Baron N. Schilling*: The Constant Currents in the air and in the sea: an attempt to refer them to a common cause.—*Robert Mallet*: Tidal Retardation of the Earth's Rotation.—*William Crookes*: On Attraction and Repulsion accompanying Radiation.—*James O'Kinealy*: Fourier's Theorem.—*Louis Schœncrdter*: On the General Theory of Duplex Telegraphy.

The Numismatic Chronicle and Journal of the Numismatic Society, No. LIII. 1874.

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Quarterly Journal of Microscopic Science. No. LV, July 1874.

Dr. Michael Foster: On the Term Endothelium.—*Ernest Haeckel*: The Gastraea Theory, the Phylogenetic Classification of the Animal Kingdom and the Homology of the Germ-Lamellae.—*Rev. M. J. Berkeley*: On the Etiology of the Madura.

The Quarterly Journal of Science. No. XLIII. July, 1874.

The Polar Star and the Pointers.—Modern Researches in Tropical Zoology.

The Ibis, a Quarterly Journal of Ornithology. Vol. IV, No. 15.

Andrew Anderson: On the Nidification of certain Indian Birds.—*R. Swinhoe*: Notes on Chinese Ornithology.—*Arthur Viscount Walden*: A reply to Mr. Allan Hume's Review of 'Die Papageien' of Dr. Otto Finsch.

The Edinburgh Review, Nos. 284 and 285, April and July, 1874.

The Quarterly Review, Nos. 272 and 273, April and July, 1874.

Westminster Review, July, 1874.

Contributions to Solar Physics. By J. Norman Lockyer, F. R. S.

Thesaurus Entomologicus Oxoniensis, or Illustrations of new, rare, and interesting Insects. By J. O. Westwood, M. A.

The American Journal of Science and Arts. Vol. VII, Nos. 40 to 41, and No. 43, of Vol. VIII.

C. F. Himes: Preparation of Photographic Dry-Plates by daylight, by desensitizing and re-sensitizing the silver compounds.—*John Trowbridge*: On a Molecular Change produced by the passage of Electrical Currents through iron and steel bars.—*J. S. Newberry*: Parallelism of coal seams.

History of India, by T. Wheeler, Vol. III.

Bleek's Comparative Grammar, Vol. I.

Revue des Deux Mondes; from 15th April to 1st August 1874.

Comptes Rendus Hebdomadaires des Séances de L'Académie des Sciences, Vol. LXXVIII. No. 14 to 26 and Vol. LXXIX, No. 1 to 4.

Revue Archéologique, Nos. 4 to 6, 1874.

Journal des Savants, for April and May, 1874.

Revue et Magasin de Zoologie, Vol. II, Nos. 3 to 6.

Revue Linguistique, Vol. VI, Fasc. IV.

Mélanges 'Archéologie Egyptienne et Assyrienne, Vol. I, Fas. IV.

Actes de la Société Philologique, Vol. IV, No. 5.

Biblische Legenden der Muselmänner, by Dr. B. Weil.

Culturgeschichte in ihrer Natürlichen Entwicklung bis zur Gegenwart.—By Friedrich von Hellwald, Nos. 1 to 4.

Aristotles' Metaphysic, by Dr. D. B. Schfüter.

Coleopterologische Hefte, No. XI and XII. By E. V. Harrold.

Flexiones Præcriticæ in editione sua Sacuntale. By Dr. Carolus Burkhard.

Schulgrammatik und Sprachwissenschaft. By Dr. J. Jolly.

Beiträge zur vergleichenden Casuslehre des Zend und Sanskrit, by
Georg Orterer.

Das Christliche Adambuch des Morgenlandes. By A. Dillmann.

Das Buch Henoch. By A. Dillmann.

Calcutta Review, for October 1874.

Pratna Kamra Nandini, or the Hindu Commentator, No. 3 to 4.

Exchange.

Athenæum for June and July 1874.

Nature, Nos. 247 to 255, 1874.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR DECEMBER, 1874.

The monthly General Meeting of the Society was held on Wednesday, the 2nd instant, at 9 o'clock P. M.

Col. H. Hyde, President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. A Silver Medal from the Royal University of Norway.

The following letter from the Chief Secretary of the University accompanied the donation :—

‘I have the honor to recommend to your special attention the bearer of this letter, Rev. Dr. Vibe, Chaplain of the King. I beg you give him also a friendly recommendation for his purpose to the authorities of the Indian Government.

‘Repeating the grateful thanks of the Royal University of Norway for the many valuable publications, which we have received from the Asiatic Society of Bengal, I beg you to accept the following medal as a token of our great esteem.’

From W. Duthoit, Esq., C. S.—five Muhammadan silver coins.

The following letter accompanied the donation :—

Benares, 25th November, 1874.

DEAR SIR,—I have your No. 548 dated 13th current and by to-day's parcel post forward to your address *two* rupees of Jalál-uddín Firúz Sháh Khilji and three of Mu'izzuddín Kaiqubád—in all 5 coins, kindly acknowledge their receipt.

‘If you wish to see where they were found and will take up a good map of the Mírzápúr District, please follow the course of the Sona from west to east till you come to Agori Khás—then a little further to the east you will see the Bijol river flowing into the Sona, and a little further still the Rehand. The coins were found at a spot near the Sona bank between the Bijol and the Rehand.

'At Agori there is now a very picturesque Fort, and near it, just over the Bijol, is a very picturesque temple (Somnāth). Agori was once a place of much trading importance. The temple was planted by Agorwālā banias who were the chief of the Agori merchants, and is still a place of pilgrimage and very sacred to this class. The Fort belongs to the Agori Barhor Rāj, now under the management of the Court of Wards.'

The following gentlemen, duly proposed and seconded at the last meeting, were elected ordinary members—

Maulawi Khuda Baksh Khan Sahib, Bankipur, (Patna); Babu Ram Das Sen, Berhampur; Captain M. Protheroe, Port Blair; R. E. Egerton, Esq., Lahore.

The following are candidates for ballot at the next meeting—

John Sutherland Gunn, M. B., Surgeon, Bengal Army, proposed by Mr. J. Wood-Mason, seconded by Mr. H. Blochmann.

Captain C. J. F. S. Forbes, Deputy Commissioner, Shwgyeen (British Burma) proposed by Col. Hamilton, seconded by Col. H. Hyde.

Richard Lydekker, Esq., B. A. Geological Survey of India, proposed by Mr. H. B. Medlicott, seconded by Mr. J. Wood-Mason.

Babu Shyama Charan Sarkar, has intimated his desire to withdraw from the Society.

The President announced that the Council have elected Dr. T. R. Lewis to be a member of their body *vice* Mr. Geoghegan, who has left India, and Babu Prannath Pandit a member of the Philological Committee.

Also that the Council have sanctioned the continuance of the pension of Rs. 3 per month, to Islam Khan, lately a taxidermist attached to the Museum, for a further period of one year, subject to reconsideration at the expiration of that time.

The following papers were read—

1. *Note on two apparently undescribed species of Goat from Northern India and a new species of Dove from the Nicobar Islands.* By ALLAN O. HUME, C. B.

In recently preparing, for the use of friends collecting them for me, a brief paper on the horns of India, I found in my collection two species that appear to be unnamed.

The first is the Suleyman Range Makhore, which differs conspicuously from *Capra megaceros* of Cashmere, in that while the horns of the latter resemble a corkscrew, those of the former are more like an ordinary screw. I have called this species *Capra Jerdoni*.

The second is the Sindh Ibex which does not, to my idea, agree at all with the descriptions or plates of *Capra Caucasica* to which it is usually referred; I have called this *Capra Blythi*.

I do not at all feel sure that these species are undescribed, but I could find no names for them and had to provide names, and as I have published them elsewhere, think it right, to prevent confusion, to put them on record in a scientific Journal.

I may also take this occasion to mention that in my account of the birds of the Nicobars and Andamans, I noticed that I had obtained at the latter Islands, a small dove, resembling *Turtur humilis*, but as I believed different.

I have since obtained a really good specimen which has convinced me that it is distinct, and I wish to take this opportunity of characterizing it.

TURTUR HUMILIOR, sp. nov.

Length, 9; Wing, 5, 6; Tail, 3.3; Bill, at front, (from where the feathers end), 0.55; Tarsus, 0.75.

? *Female*.—Head greyish-brown paling on forehead. Rump deep slatey, rest of upper parts, breast and middle of abdomen brown, with a broad black half-collar, on the back of the neck, and a more or less venaceous tinge on the lower parts; wing-lining, sides and flanks deep slatey-grey.

I had no specimens to compare it with, so sent it to Mr. Brooks, he remarks. "I have never seen any dove like the Andaman one you have sent.

"Its characteristic points are—1, the broad collar; 2, (and the most important) the dark slate coloured wing-lining; 3, the very brown hue. Its wing is much longer than that of *T. humilis* ♂ which has a pale wing-lining and is quite a differently toned bird. It is of similar size to *T. cambayensis*, but has a much longer wing. It is very much smaller than ♂ *risoria* which has a light wing-lining and the brownest *risoria* is quite pale compared with this dusky Andaman dove."

I hope to figure this sombre little Dove later, in the mean time this will serve to call attention to it.

2. *Description of a new species of Helicida of the genera Helix and Achatina, from the Khasi Hills and Manipur.*—By MAJOR H. H. GODWIN-AUSTEN, F. Z. S.

This paper will be published in the Journal, Part II, 1875, with illustration.

3. *Notes on the Transit of Venus of 1874.*—By CAPTAIN W. M. CAMPBELL, R. E.; communicated by CAPTAIN J. WATERHOUSE.

The following brief notes regarding the preparations being made in this country to observe the rare and important phenomenon of the Transit of Venus, may be of interest to the Society.

The observations will be made at Roorkee in the North-West Provinces by Col. J. F. Tennant, R. E., assisted by Captains W. M. Campbell of

the G. T. Survey and J. Waterhouse, Assistant Surveyor General, with Sergt. J. Harrold, R. E., and two men of H. M.'s 55th Regt. as assistant photographers.

The instrumental equipment of the party consists of—

1st.—A very fine 6-in. Equatorial by Cooke and Sons.

2nd.—A new 36-inch Theodolite by Troughton and Simms, lately sent out for the G. T. Survey and lent for the occasion.

3rd.—A Photo-heliograph by Dallmeyer.

4th.—A quadruple Chronograph.

5th.—An Astronomical Clock which marks the time in seconds on the chronograph and, also by electricity, shows time on three dials, one of which is placed close beside each of the three principal instruments.

For the shelter and accommodation of the instruments a temporary Observatory has been built comprising a room for the standard clock, chronograph and transit instrument, with two attached revolving domes for the theodolite and photo-heliograph. In immediate connection with the latter of these domes is a convenient dark-room for the preparation of the photographic plates. The equatorial is in a separate detached revolving dome.

The equatorial will be used by Colonel Tennant, who will observe the contacts, take measurements between the cusps of Venus, while she overlaps the sun's limb, with a double-image micrometer, and also probably geometrical measurements of her position throughout the Transit.

He may also use the transit instrument to determine time by daylight transits of bright stars during the phenomenon.

Captain Campbell will use the 36-in. theodolite to observe the contacts, and throughout the Transit he will take observations of the planet's position on the sun's disc, by means of a succession of transits of sun and planet, recorded with the chronograph.

Captain Waterhouse will take photographs on six-inch plates, with a solar image of about 4 inches in diameter, in the photo-heliograph at intervals of two minutes nearly throughout the Transit. He will also, by means of an apparatus constructed by Mr. Warren de la Rue on the principle first proposed by M. Janssen, the eminent French astronomer, and known as the "Janssen slide," endeavour to obtain a series of pictures of the sun's limb and planet together for some seconds, before and after the moment of each of the last three contacts, and also about the times of bisection. It may be explained that the Janssen slide is an ingenious arrangement for carrying a revolving circular sensitive plate about 11" in diameter in such a manner that small radial segments near the circumference may be successively exposed to light at intervals of about one second, thus enabling 60 small pictures of any specific part of the sun's image to be taken in the course of a minute, forming an annular belt about $1\frac{1}{4}$ inch wide round the circumfer-

ence of the plate. The number of photographs taken will probably be about 120 besides 6 of the Janssen plates. The ordinary wet process will be used, the dry plates proposed to be used by other observing parties not having been found to work satisfactorily.

Captain W. J. Heaviside, R. E., of the G. T. Survey is expected to join the party for a few days, and he will also observe the contacts with a fairly powerful telescope.

Arrangements have been made for instantaneously recording on the chronograph the time of exposure of each photograph and of each of the 60 pictures taken on a Janssen plate.

All time observations will be recorded on the chronograph.

This instrument consists of clock-work, driving four wheels, over each of which a long tape of paper (such as used in telegraph offices) is passed and drawn out by friction at a very uniform rate of half an inch per second. On each tape the clock records seconds by means of a pricker worked electrically, while the observer to whom the tape belongs, has in his hand a tappet key, by which he can work at will a second pricker alongside of the first.

In order to trace the clock time on the paper, a mark is omitted at the beginning of each minute.

In addition to the apparatus above described, there is a model of the transit, similar to the one used at Greenwich. The advantage of this is, that with a little practice, the observer becomes familiar with the phenomenon and knows what to expect, or at least gets some notion of it, and fixes his ideas of the exact phase he will seek to observe.

By combined practice with two telescopes, the relative personal equations of the observers are arrived at, and such observations will be repeated after the Transit is over.

Familiarity with the model will also enable an observer to estimate the occurrence of each phase very exactly, so that he can give a signal of warning to others, for instance in the present case, a signal will be given to Capt. Waterhouse for the preparation and exposure of the "Janssen" plate, a matter of great importance, as an error of a few seconds in exposing it would render it useless, and Capt. Waterhouse will have no means of judging the nearness of the contact for himself.

The important phases for observation are:—

1st.—The breaking of the 'black drop' at Ingress.

2nd.—The forming of the same at Egress.

We know that when well inside the sun's limb, Venus will appear to be connected with it by a band of shadow, but we do not know exactly what the behaviour of this band will be, whether it will burst at Ingress, or form at Egress, in a well defined way, or whether it will fade out gradually at Ingress and form slowly at Egress.

To guard against this uncertainty, every one has agreed to observe—

At Ingress. The first distinct lessening of the intensity of shadow between the limbs.

At Egress. The first definite appearance of shadow as intense as the disc of Venus.

After the first there may still remain a shadow less dark than Venus, which will die away gradually; while on the other hand, at Egress, such a shadow may precede the fully black shade.

The two phases above described are the phenomena to be observed, but in addition to them, if it can be done without imperilling their observation, the last and first appearance of shade of any kind must be noted.

The times may also be noted at which it is estimated that the two limbs would just touch, if clearly seen without any distortion, Venus being just within the sun's limb.

Lastly, at Egress, an attempt may be made to note the last contact of the limbs, Venus being outside the sun, *i. e.* the last external contact.

All observations will be useless unless the time is accurately known, and the comparison of the clock or chronometer used, with a clock whose error and rate are well determined both before and after the observations, should form part of the record of the observations.

Or, if the chronometer is compared with daily time signals, the comparison should be continued for one or two days after the Transit and included in the record with the comparison of the preceding days. In any case, the method by which the recorded times are arrived at, should be fully explained, and the observations of all sorts, with full means for testing the whole of the instrumental adjustments. If a transit instrument is used, the Level readings, Collimation tests, &c. and a full description of the instrument must be given.

The telescope used must be described as well as possible, as regards opening of object-glass, focal length, magnifying power, &c.

The place of observation must also be accurately described, or its latitude and longitude given.

NOTE.—The Transit of Venus having taken place since the above was written it may be interesting to state before going to press that the Transit was successfully observed in India, by Col. Tennant's party at Roorkee where 107 six-inch photographs and 5 Janssen plates were taken, with favourable weather; at Lahore by Captain G. Strahan R. E.; at Masûri by Mr. J. B. N. Hennessey, who obtained some interesting results with the spectroscope; at the Surveyor General's Office, Calcutta, where 39 photographs and several eye observations were made; at Muddapur by a party of Italian astronomers under the direction of Sig. Tacchini, the distinguished spectroscopist, and at Kurrachee by General Addison. At Madras the weather proved unfavourable.

Tidings of the observations have also been received from the parties scattered in various parts of the world, mostly satisfactory.

A long time must elapse before any final results can be arrived at, but already many accounts have appeared in the newspapers giving the personal impression left by the event on different observers; and in some respects these are very conflicting.

Some say they saw no appearance of a 'black drop,' while according to others in was most distinct.

The phenomena seemed almost a repetition of model practice in Egypt, according to telegrams in the *Times*, whereas at Roorkee no resemblance was found, and we learn from other observers in India, using powerful instruments, that they saw no appearance of the 'black drop.' The different appearances must be greatly due to differences of instrumental power and atmospheric conditions, probably the more perfect the instruments, the less the 'black drop' features.

Many observers saw distinctly the whole of Venus, while more than half her disc was outside the sun's limb, her dark outline being fringed with light, and M. Janssen telegraphs from Japan that her disc was seen outside the sun's limb against the corona. Much discussion as to the planet's atmosphere will doubtless arise from this appearance, which seems to be confirmed by some of the photographs.

Other observers, notably the Italian party at Muddapur, found proofs of her atmosphere by means of the spectroscope.

4. *Extracts from a Letter from W. H. DALL, of the U. S. Coast Survey to REV. C. H. A. DALL, M. A., Calcutta.*

"Unalashka; Alaska Territory;—September 22nd, 1874;—United States Coast Survey,—Schooner Yukon.

"Our work is practically closed for the season, and we start for San Francisco about the end of this month. I commence now a letter, in order that you may have the fullest and earliest account of our doings.... Our work has extended over a large part of the coast of the territory this year. We began by rating chronometers and making some corrections of the charts, at Sitka. Thence we sailed for a very remarkable place called Lituya Bay. This was surveyed by La Perouse in the last century, and is very difficult to get in and out of. Across the narrow entrance the breakers roll continually, except at slack water, in calm weather. La Perouse lost, in this tide bore, two boats and sixteen men. We got in and out by a lucky combination of circumstances; in five days making a reconnaissance of the entrance; which is not correctly represented on the old charts. We came near having trouble with a party of Sitka natives here: they were very insolent, and attempted to board the vessel while we were away surveying; but those left on board fortunately prevented it without bloodshed. These natives are the worst I know. They are well armed and have advanced far enough in civilization to distil their own rum out of molasses which they buy from the traders. They invited one of our party to drink, when he was ashore, and he reported the liquor to be tolerably good. They are also quite fearless, and when opportunity offers, very impudent.

Five large glaciers impinge on this Bay. The upper part of it is a mere rift in mountains 6,000 to 8,000 feet high; and resembles a

Yosemite full of salt water and adorned by glaciers,—but on a grander scale. The highest mountains in North America, and the grandest living glaciers, out of the Arctic and Antarctic Zones—are here.

We made some measurements, the best hitherto obtained, and got a height of about 15,000 feet for Mts. Fairweather and Crillon, with an uncertainty of three hundred feet. The smaller mountains, all about the bay, range from 6,000 to 11,000 feet:—so that the loftiness of the principal peaks is not so apparent as their proximity to the sea would lead one to infer.

Leaving Lituya Bay, we coasted along, finding work at every point.

The charts of this region are very inaccurate. We moved, so to speak, the entire shore-line of America between Lituya Bay and Mount St. Elias, to the westward, from four to six miles (geographical); thus increasing the area of the British possessions in British America by that area, some eight hundred geographical square miles; as the American boundary is a line ten marine leagues from the coast. We have proved the relative accuracy of much of La Perouse's work, as compared with that of later map-makers. We have a reconnaissance of the part of the coast mentioned, sufficiently accurate for a general chart. Our instruments are so much better and our methods so much more exact, that we have been able to improve materially on the work of our predecessors, though they did wonders with their slender means. I cannot describe the sublimity of the scenery of this part of America. In original grandeur it far surpasses Switzerland; at least I am so informed by some who have seen both; and I can well believe it. We surveyed Port Mulgrave, in Admiralty or Bering Bay, and obtained a very fine series of observations for the height of Mount St. Elias; in all sixty-four observations of it from four stations, with a very delicate instrument of Gambey's, reading to five seconds of the arc. Our observations cannot be worked up until we return; as they will require some special corrections for which our tables are not extensive enough; but we have, from rough calculations, data sufficient to infer that the result will be a height in the neighbourhood of 19,000 feet. All previous observations have been made at sea with sextant angles; a very imperfect method, especially when the doubtful nature of a sea position, is taken into account. Hence the great difference between our results and those of some previous explorers. La Perouse had an error of twelve miles in his reckoning, and the Russians one of six miles. The mountain is nearly under the meridian of 141 west, where Captain Cook put it. The peak and about half a mile down the east flank is in American territory; so I suppose we may claim the whole mountain as ours. It is generally supposed that these high mountains are volcanos. With regard to Fairweather, Crillon and St. Elias, I am convinced this supposition is erroneous. There is no cone or crater nor any signs of

one ever having existed on either of them. I could see distinctly the stratification of the rock for two-thirds of the height of St. Elias, which is shaped on one side like an enormous crystal. The summit has, it is true, a sharp peak, but it is like the smaller granite peaks of the Sierras and the mountains of the whole west coast inside the Coast Range properly so called, which runs out in Oregon and Washington Territory. The rock at Lituya was garnetiferous granite, and I saw no volcanic rock there at all. However there are numerous volcanic outlets, mostly cold and dead, among these high mountains, but they are all low and are evidently of subsequent date to the elevation of the range of St. Elias and others.

From Bering Bay we went to Port Etches in Prince William Sound, to Middleton or Otchek Island, and to Kadiak, in the order mentioned. At the last place we rated chronometers.

Middleton is a low island, surrounded by reefs, and we were very fortunate in obtaining a calm day, enabling us to land and get observations without any delay. The vegetation here was very luxuriant. We found one leaf of a skunk-cabbage (which, as you know, usually grows from six to twelve inches high) four feet long and two feet broad and with a stalk four and a half inches thick.

Much of our work this summer lay among islands without harbors or safe anchorages, except in calm weather; and we were especially favoured in the weather we had, when in such localities; in which we were not delayed a day anywhere by rough weather.

After Kadiak we visited Chirikoff Island, once inhabited, and now reported to be full of wild dogs of great ferocity. These were said to be the progeny of some native dogs abandoned there some ten years ago; and a party sent down from Kadiak some years since, to hunt, came back and reported that the ferocity of the assembled dogs, who were congregated on the beach, had deterred them from landing. We therefore approached this island with some curiosity; but saw only one dog, the day after landing, and he ran away before we could come up with him. We next visited the Semidi Islands, a rocky group in deep water without harbors; and then anchored in Chignik Bay. Here we had a good deal of bad weather. I found a good many fossil plants here, mostly Eocene or Miocene in age. There are lignite beds here.

We also obtained a number of reindeer, whose fine juicy meat was an agreeable addition to our sea fare. From hence we went to examine some isolated rocks off the coast of Alaska Peninsula;—and to a small anchorage near Mitrophania Island; and thence to the Shumagins. Here we did a good deal of work, finishing our reconnaissance of the group begun in 1872. Then a few days were spent in the vicinity of the dreaded Saunakh Reefs;—and we sailed for Unalashka to rate chronometers. Our next point was

St. Paul, one of the Seal Islands, where we obtained a good series of observations, a reconnaissance of the island and magnetic declination, and had a good opportunity of examining the wonderful exhibition of seal-life, now paralleled by no other place on the globe. There are estimated to be four millions of fur-seal on this island; though the means for determining the number are not very decisive. Their habits would fill a volume, and are most interesting and complex.

Hence we sailed for Nuniwak Island, where we found Eskimo living, and bought three or four hundred ethnological articles of their make, for use or ornament. I also took eleven skulls from an ancient place of deposit of the dead. These are laid above ground, and covered only with stones and drift-wood. We decided the position and surveyed the anchorage, and, after fixing the west point of the island, sailed for Hagmeister Strait, near Cape Newenham. Here we got good observations and then sailed for Port Möller on the north side of the Peninsula of Alaska. Here we had good luck, as usual; beside getting many interesting things out of the ancient shell-heaps, and killing seven reindeer. We discovered some hot springs containing sulphur and alum,—a bed of fine sandstone, well suited for grindstones,—of which we carried off a lot for holystones; and most interesting of all, a deposit of Triassic or Jurassic fossils, containing Belemnites, Ammonites, *Inoceramus*, *Pecten* and other fossils. Fine glaciers, active volcanoes, unlimited sandbanks, covered with walrus and hair-seal, —wolves, bears, foxes and hundreds of deer—made up the *tout ensemble* of Port Möller. Wishing to complete the reconnaissance of St. George and Paul, we sailed again for the Pribyloff Islands, and succeeded in getting tolerable observations on St. George, establishing its position thirteen miles west of its location on the present charts. This group has been in doubt for a long time, and it is a matter of satisfaction to me to have been able to settle the question of position. Our bad weather began soon after leaving Port Möller, and has continued almost without interruption to the date of writing.

We reached Unalashka after several stormy days, and since then have been principally engaged in running some twenty miles of shore line, getting our chronometers rated again, and completing our annual (Unalashka) magnetic observations. The Easterly variation is rapidly decreasing here.

The total result of our season's work may be summed up as follows: Seventeen harbour and anchorage charts (reconnaissance) completed. Twelve thousand three hundred and sixteen observations of all kinds taken; including seventy-seven thousand meters of shore line and twenty-five miles of soundings. Astronomical positions twenty-four, fixed by three thousand six hundred and forty-three observations; each including latitude, time and declination. Eight hundred and eighty-four magnetic observations.

Twenty-two ports visited, six thousand miles sailed over,—and this all done, excluding the time spent at sea, in sixty-two working days. The probable error of most of our positions will not exceed two-tenths of a second of an arc."

P. S.—dated—"San Francisco, October 16th, 1874."

"We have arrived safely, after a rough but very short passage of thirteen days from Unalashka. Very sorry was I to hear of the death of Dr. Stoliczka. Get for me, if you possibly can, his palæontological volumes of the Indian Survey. Valuable in themselves, they will be especially so to me, as in the last one he adopts my views on the Brachiopods, with some very complimentary remarks.... So busy, I can only add that I go to Washington in a month, to work up the results of our Alaska campaign. Address me there, care of the Smithsonian Institute."

W. H. DALL."

Captain Marsh gave a short account of his travels in Persia and Afghanistan.

LIBRARY.

The following additions have been made to the Library since the meeting held in November last.

Presentations.

* * Names of Donors in Capitals.

Proceedings of the Royal Society of London. Vol. XXII, No. 154.

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ERRATA.

Page 72, line 22, *for* uncle *read* father.

Page 100, note, *for* Carlyle *read* Carlleyle.

Page 106, note, Add—"Túyah is the name of an Afghán tribe."

Page 160, line 16, *for* گور *read* گو

Page 162, line 33, *for* دني ولي *read* دني

Page 163, line 6, substitute 'The pole of the period has left the lower world.'

Page 163, line 16, Add—' In this *tárikh* we have to *read* شيخى

Page 168, line 2, dele ٤٥

Page 168, second foot note, Add—' Mr. Beale translates *Muqaddasi* by 'an inhabitant of Jerusalem.'

Page 173, third foot note, Add—"The literal translation is—"The Ráná became a Rání [*i. e.*, a woman] from the terror of his sword."

Page 179, line 27, *for* العتيق *read* العتيق

Page 180, line 3, substitute, "Like the old house [the Ka'bah]."

A. H. 1074.

Page 210, line 27, *for* it *read* it is.

APPENDIX.

LIST OF MEMBERS
OF THE
ASIATIC SOCIETY OF BENGAL,
ON THE 31ST DECEMBER, 1873.

LIST OF ORDINARY MEMBERS.

The * distinguishes Non-Subscribing, the † Non-Resident Members,
and the ‡ Life-Members.

N. B.—Gentlemen who may have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Gentlemen who are proceeding to Europe, with the intention of not returning to India, are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with rule 14 B. of the Bye-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.			
1860 Dec.	5.	Abdullatif Khán Bahádur, The Hon., Maulavi.	Calcutta
1868 Sept.	2.	†Adam, R. M., Esq.	Sambhar Lake viá Jaipur
1860 July	4.	†Ahmad Khan, Sayyid, Bahádur.	Benares
1872 April	3.	†Ahsanullah, Khwajah.	Dacca
1860 April	4.	†Aitchison, J. E. T., Esq., M. D.	Mari, Panjáb
1866 Jan.	17.	*Allan, Lieut.-Col. A. S.	Europe
1871 June	7.	†Alexander, J. W., Esq.	Benares
1860 Oct.	3.	Amír Ali Khan Bahádur, Munshi.	Calcutta
1865 Jan.	11.	*Anderson, Dr. J., F. L. S.	Europe
1872 June	5.	†Anderson, A., Esq.	Futtehghur
1871 Sept.	6.	†Atkinson, E. T., Esq., C. S.	Nynée Tal
1855 July	4.	Atkinson, W. S., Esq., M. A., F. L. S.	Calcutta
1869 Feb.	3.	†Attar Singh Bahádur, Sirdár.	Loodiana
1870 Feb.	2.	Baden-Powell, H., Esq., C. S.	Calcutta
1873 Aug.	6.	†Badgley, Capt. W. F.	Shillong
1859 Aug.	3.	Baláichánd Sinha, Bábu.	Calcutta
1865 Nov.	7.	†Ball, V., Esq., Geol. Survey.	Geol. S. Office
1860 Nov.	1.	Banerjea, Rev. K. M.	Calcutta
1869 Dec.	1.	†Barker, R. A., Esq., M. D.	Beerbhoom
1873 March	5.	Barclay, G. W. W., Esq., M. A.	Calcutta
1873 Jan.	8.	Bate, Rev. J. D.	Allahabad
1860 July	4.	†Batten, G. K. M., Esq., C. S.	Agra
1859 May	4.	Bayley, E. C., The Hon'ble., B. C. S., C. S. I.	Calcutta
1861 Feb.	6.	†Bayley, S. C., Esq., B. C. S.	Patna
1873 Feb.	5.	Bayne, R. R., Esq., B. A.	Calcutta
1861 Sept.	7.	†Beames, J., Esq., B. C. S.	Cuttack
1841 April	7.	Beaufort, F. L., The Hon. B. C. S.	Calcutta

Date of Election.		
1867 July 3.	Belletty, N. A., Esq.	Calcutta
1869 Jan. 20.	†Bellew, Dr. P. F.	Bombay Mint
1871 March 1.	Benedict, E., Esq., C. E., M. Inst. C. E.	Calcutta
1862 Oct. 8.	Bernard, C. E., The Hon., B. C. S.	Calcutta
1872 Aug. 7.	*Beverly, H., Esq., C. S.	Europe
1862 June 4.	†Bhanu Daji, Dr.	Bombay
1864 Nov. 2.	Bhudeva Mukerjee, Bábu.	Chinsurah
1873 Aug. 6.	†Bingham, Lieut. C. T.	Allahabad
1872 Nov. 6.	Bisset, Lieut. W. S. S., R. E.	Calcutta
1873 Dec. 3.	Blackburn, J., Esq.	Calcutta
1857 Mar. 4.	Blanford, H. F., Esq., A. R. S. M., F. G. S.	Calcutta
1859 Aug. 3.	*Blanford, W. T., Esq., A. R. S. M., F. G. S.	Europe
1873 Aug. 6.	Bligh, W. G., Esq.	Muttra
1873 April 2.	Blisset, T. T., Esq.	Calcutta
1864 April 6.	Blochmann, H., Esq., M. A.	Calcutta
1871 April 5.	†Bourne, T. W., Esq.	Central Provinces
1871 April 5.	†Bourne, Walter, Esq., C. E.	Madapur
1868 Jan. 15.	Boxwell, J., Esq., C. S.	Serampore
1872 June 5.	†Brooks, W. E., Esq., C. E.	Khugoul
1871 Jan. 4.	Brough, R. S., Esq.	Calcutta
1866 Jan. 17.	†Brown, Col. D.	Moulmein
1866 Nov. 7.	†Browne, Lieut.-Col. Horace A.	Thayetmyo
1866 June 6.	†Brownfield, C., Esq.	Kamrup
1868 June 3.	†Buck, E. C., Esq., C. S.*	Cawnpore
1871 July 5.	Buckland, C. T., Esq., C. S.	Hughli
1866 June 6.	Buckle, Dr. H. B., C. B.	Calcutta
1871 Sept. 6.	†Buckle, H., Esq.	Akyab
1872 Jan. 3.	*Butcher, W. D., Esq., M. R. C. S.	Europe
1873 Aug. 6.	†Butler, Capt., J.	Samaguting, Na- ga Hills
1869 Jan. 20.	†Cadell, A., Esq., B. A., C. S.	Muzaffarnagar
1863 June 3.	Campbell, The Hon'ble Sir G., K. C. S. I.	Calcutta
1873 March 5.	Cappel, A., Esq.	Calcutta
1860 Jan. 3.	†Carnac, J. H. Rivett, Esq., B. C. S.	Allahabad
1868 Aug. 5.	†Chandramohan, Gosvámi, Pandit.	Gowhatty
1863 Aug. 5.	†Chandranáth Ráy, Rája.	Nator
1872 Dec. 4.	†Chard, Rev. C. H.	Thayetmyo
1871 Sept. 6.	†Chisholm, R. F., Esq.	Madras
1868 Feb. 5.	†Clark, Major E. G., Bengal Staff Corps.	Kherce, Oudh
1871 March 1.	Clarke, C. B., Esq.	Calcutta
1872 Aug. 7.	†Clutterbuck, Capt. F. St. Quintin.	Attock
1871 Oct. 4.	*Cooke, H. G., Esq., C. S.	Europe
1868 Dec. 2.	†Cooke, J. E., Esq.	Haidarabad
1872 June 5.	*Court, Major M. H.	Europe
1873 Aug. 6.	Cunningham, D. D., Esq., M. B.	Calcutta
1847 June 2.	†Dalton, Col. E. T., C. S. I., Staff Corps.	Chota Nagpore
1870 May 4.	†Damant, G. H., Esq., C. S.	Dinajpur

Date of Election.		
1861 Nov.	6.	†Davies, The Hon'ble R. H., C.S. I., B. C. S.
1869 April	7.	†Day, Dr. F., F. L. S., F. Z. S.
1856 June	4.	†DeBourbel, Major R., Royal Engrs.
1870 Feb.	2.	†DeFabeck, F. W. A., Esq., I. M. Service.
1872 Aug.	7.	Dejoux, P., Esq.
1869 Oct.	6.	†Delmerick, J. G., Esq.
1873 Jan.	8.	†Dennys, H. L., Esq.
1864 July	6.	Devendra Mallik, Babu.
1862 May	7.	†Dhanapati Singh Dughar, Ráy, Bahádur.
1853 Sept.	7.	Dickens, Col. C. H., C. S. I.
1870 May	4.	*Dobson, G. E., Esq., B. A., M. B.
1859 Sept.	7.	*Douglas, Col. C.
1869 Feb.	3.	*Drew, F., Esq.
1870 March	8.	†Duke of Edinburgh, His Royal Highness.
1873 July	2.	†Durand, H. M., Esq., C. S.
1867 June	5.	†Duthoit, W., Esq., C. S.
1871 March	1.	Dvijendranath Thakur, Babu.
1868 Oct.	7.	*Eddowes, W., Esq., M. D.
1863 May	6.	†Edgar, J. W., Esq., B. C. S.
1871 Dec.	2.	†Elliot, J., Esq., M. A.
1846 Jan.	7.	*Elliot, Sir Walter, late M. C. S.
1859 Nov.	2.	†Elliot, C. A., Esq., B. C. S.
1871 Oct.	4.	†Evezard, Col. G. E.
1863 Oct.	7.	Ewart, J., Esq., M. D.
1859 Dec.	7.	Fath Ali, Maulavi.
1851 May	7.	*Fayrer, Dr. J., C. S. I.
1863 Jan.	15.	†Fedden, Francis, Esq., Geol. Survey.
1868 May	6.	Field, C. D., Esq., M. A., C. S.
1869 Sept.	1.	†Fisher, J. H., Esq., C. S.
1872 Dec.	4.	†Forbes, Major, J. G., R. E.
1861 Feb.	6.	†Forest, R., Esq., Civil Engineer.
1869 Oct.	2.	†Forlong, Lieut.-Col. J. G. R., M. S. C.
1863 June	3.	†Forsyth, T. D., Esq., C. B.
1871 Nov.	1.	†Foster, J. M., Esq., M. R. C. P.
1873 July	2.	Fraser, Capt. E.
1869 Sept.	1.	†Fryer, Capt. G. E., Dy. Commissioner.
1867 Sept.	4.	Fyfe, The Rev. W. C.
1873 Dec.	3.	†Gamble, J. S., Esq.
1871 June	7.	Gangaprasad Sinha, Babu.
1871 Aug.	2.	†Gangaprasad, Munshi.
1859 Aug.	3.	Gastrell, Col. J. E., Supdt. Rev. Survey.
1862 Feb.	5.	†Gauradás Baisák, Babu.
1867 Sept.	4.	†Gauvain, Capt. V.
1867 Dec.	4.	Gay, E., Esq., M. A.
		Lahore
		India
		Oudh
		Jaipur
		Calcutta
		Delhi
		Nagpur
		Calcutta
		Azinganj
		Calcutta
		Europe
		Europe
		Europe
		Europe
		Bhágapur
		Ghazeepore
		Calcutta
		Erinpora
		Darjeeling
		Allahabad, Muir
		Central College.
		Europe
		Allahabad
		Poona
		Calcutta
		Calcutta
		Europe
		Geol. S. Office
		Calcutta
		Raipore
		Lucknow
		Dehra
		Lucknow
		Kashghar
		Nazira, Assam
		Calcutta
		Sandoway, Arra-
		kan
		Calcutta
		Silligoree
		Calcutta
		Moradabad
		Calcutta
		Jehanabad
		Calcutta
		Calcutta

Date of Election.			
1859 Sept.	7.	Geoghiegan, J., Esq., B. C. S.	Calcutta
1869 Feb.	3.	†Giriprasād Sing, Thākur.	Allighur
1861 Feb.	6.	*Godwin-Austen, Major H. H., Topographical Survey.	Europe
1869 Oct.	6.	†Gomes, A. D. B., Esq.	Sunderbuns
1872 Nov.	6.	*Gordon, C. B. P., Esq.	Europe
1862 July	2.	†Gordon, J. D., Esq., C. S. I., C. S.	Mysore
1869 July	7.	†Gordon, Robert, Esq., C. E.	Henzaday
1871 March	1.	†Govindacumar, Chaudhuri.	Dacca
1863 Nov.	4.	†Gowan, Lieut.-Col. J. Y.	Allahabad
1866 June	6.	Gribble, T. W., Esq., B. C. S.	Calcutta
1861 Sept.	4.	†Griffin, L. H., Esq., B. C. S.	Lahore
1873 Aug.	6.	Garisichandra Sinha, Kumara.	Calcutta
1861 Feb.	6.	†Growse, F. S., Esq., M. A., B. C. S.	Muttra
1871 Jan.	4.	Gunendrayath Thakur, Babu.	Calcutta
1864 Dec.	5.	†Gurucharan Dās, Bābu.	Backergunge
1871 June	7.	Habiburrahman, Maulavi.	Calcutta
1867 July	3.	†Hacket, C. A., Esq., Geol. Survey.	Geol. S. Office
1869 April	3.	†Hæberlin, The Rev. C.	Ranchee
1866 Jan.	17.	†Hamilton, Lieut.-Col. T. C.	British Burmah, Rangoon
1855 March	7.	†Hamilton, R., Esq.	Wardah
1871 July	5.	Hamilton, Col. O.	Calcutta
1861 March	1.	†Harachandra Chaudhuri, Babu.	Mymensing
1866 Nov.	1.	Harendra Krishna Bahādūr, Kumār.	Calcutta
1871 Feb.	1.	†Harkness, T. F., Esq., C. S.	Azingarh
1861 Feb.	2.	†Harrison, A. S., Esq., B. A.	Muir's College, Allahabad
1859 Oct.	12.	*Haughton, Col. J. C., C. S. I.	Europe
1873 May	7.	Hector, Rev. John M. A.	Calcutta
1862 Aug.	6.	Heeley, W. L., Esq., B. A., C. S.	Calcutta
1872 May	1.	Heilgers, W., Esq.	Calcutta
1853 July	6.	*Herschel, Sir W. J., Bart., B. C. S.	Europe
1868 Aug.	5.	†Hobart, R. T., Esq., C. S.	Etah
1872 Nov.	6.	†Holcombe, Lieut. W. A.	Assam
1872 Dec.	4.	†Hoernle, Rev. A. F. R., Ph. D.	Benares
1868 Nov.	4.	*Holroyd, Capt. W. R. M.	Europe
1873 Jan.	8.	†Houston, G. L., Esq.	Johnstone Castle, Renfrewshire
1863 Jan.	15.	†Howell, M. S., Esq., C. S.	Benares
1871 April	5.	Howell, A. P., Esq., C. S.	Calcutta
1866 Feb.	7.	Hoyle, G. W. Esq.	Calcutta
1867 Aug.	7.	†Hughes, T. H., Esq., A. R. S. M., F. G. S. Geol. Survey of India.	Geol. S. Office
1873 March	5.	*Hughes, A. J., Esq., C. E.	Europe
1866 Jan.	17.	†Hughes, Captain W. G., M. S. C.	Arracan
1870 Jan.	5.	Hume, Allan O., Esq., C. B., C. S.	Calcutta
1870 June	1.	Hunter, W. W., Esq., LL. D., C. S.	Calcutta

Date of Election.		
1868 April 1.	Hyde, Lieut.-Col. H., R. E.	Calcutta
1872 Dec. 4.	†Ibbetson, D. C. J., Esq., C. S.	Karnál, Panjáb
1866 March 7.	*Irvine, W., Esq., C. S.	Europe
1871 March 8.	Isaac, T. S., Esq., C. E.	Calcutta
1853 Dec. 7.	†Isvaríprasád Singh Bahádur, Raja.	Benares
1865 June 7.	†Jaykissen Dás Bahádur, Rájá, C. S. I.	Allighur
1873 Aug. 6.	Jogesachandra Datta, Babu.	Calcutta
1866 Feb. 7.	†Johnson, W. H., Esq.	Sialkote
1862 March 5.	†Johnstone, Major J. W. H., Dy. Commis- sioner.	Bannu, Panjáb
1867 Dec. 4.	*Johnstone, Capt. J.	Europe
1873 Dec. 3.	†Johor, H. H., Maharaja of, K. C. S. I., K. C. C. I.	New Johor, near Singapore
1873 April 2.	Jones, F., Esq.	Calcutta
1869 April 7.	Kabíruddín Ahmad, Maulavi.	Calcutta
1871 May 3.	Kalíprasanna Ghosh, Babu.	Calcutta
1861 Dec. 4.	†Kempson, M. Esq., M. A.	Bareilly
1867 Dec. 4.	King, G., Esq., M. B.	Calcutta
1867 March 6.	†King, Capt. H. W.	P. & O Co.'s Office
1862 Jan. 15.	†King, W., Jr., Esq., Geol. Survey of India.	Geol. Surv. Office
1867 March 6.	†Knox, G. E., Esq., C. S.	Allahabad
1860 May 5.	Kurz, S., Esq.	Calcutta
1868 Feb. 5.	*Lees, L. H., Esq., M. D.	Europe
1859 Dec. 7.	†Leonard, H., Esq., M. A., C. E.	Panjáb
1870 July 6.	Lethbridge, E., Esq., M. A.	Calcutta
1869 June 2.	*Leupolt, J. C., Esq., C. S.	Europe
1873 Feb. 5.	Lewis, T. R., Esq., M. B.	Calcutta
1864 Nov. 2.	Locke, H. H., Esq.	Calcutta
1869 April 7.	†Lockwood, E. D., Esq., C. S.	Monghyr
1866 Jan. 17.	†Low, J., Esq., G. T. S.	Almora
1869 July 7.	Lyall, C. J., Esq., B. A., C. S.	Calcutta
1870 April 6.	†Lyman, B. Smith, Esq.	Japan
1866 June 6.	*Macdonald, Major J., Staff Corps.	Europe
1873 May 7.	†Mackay, W., Esq., C. E.	Port Blair
1873 Dec. 3.	McLeod, K., Esq., M. D.	Calcutta
1848 April 5.	†MacLagan, Col. R., R.E., F.R.S.E., F.R.G.S.	Lahore
1867 July 3.	Macnamara, Dr. C.	Calcutta
1870 May 4.	†Macnaghten, C., Esq.	Rajkote College, Kattywar
1867 April 3.	Mahendralál Sircár, Dr.	Calcutta
1867 April 3.	†Mainwaring, Lieut.-Col. G. B.	Calcutta
1862 Sept. 3.	†Mallet, F. R., Esq., Geol. Survey.	Geol. S. Office
1852 Nov. 3.	Manickjee Rustamjee, Esq.	Calcutta
1872 Nov. 6.	†Man, E. H., Esq.	Port Blair

Date of Election.			
1869 July	7.	†Markham, A. M., Esq., C. S.	Bijnour
1873 July	2.	†Marshall, C. W., Esq.	Berhampore
1873 Aug.	6	†Marshall, Lieut.-Col. W. E.	Mussooree
1860 March	7.	Medlicott, H. B., Esq., F. G. S., Geol. Survey of India.	Calcutta.
1871 Sept.	6.	†Miles, Capt. S. B.	Bombay
1870 July	6	Miller, A. B., Esq.	Calcutta
1867 June	5.	Milman, R., D. D., The Right Rev. Lord Bishop of Calcutta.	Calcutta
1867 March	6.	*Montgomerie, Major T. G., R. E.	Europe
1854 Dec.	6.	Morris, G. G., The Hon'ble B. C. S.	Calcutta
1854 Oct.	11.	†Muir, Sir W., K. C. S. I., B. C. S.	Allahabad
1862 July	2.	†Napier of Magdala, Lord R., General G. C. S. I., G. C. B.	Simla
1869 May	5.	Nevill, G. Esq., C. M. Z. S.	Calcutta
1865 Feb.	1.	†Newal Kishwar, Munshi.	Lucknow
1871 Jan.	4.	*Newton, Isaac, Esq.	Europe
1872 May	1.	†Niranjan Mukerji, Babu.	Benares
1869 July	7.	†Nursing Rao, A. V., Esq.	Vizagapatam
1871 July	5.	†Oates, E. W., Esq., C. E.	Thayetmyo
1851 June	4.	*Oldham, T., Esq., LL.D., F. R. S.	Europe
1873 Aug.	6.	Olpherts, W. J., Esq.	Calcutta
1864 Mar.	2.	Palmer, Dr. W. J.	Calcutta
1873 Aug.	6	Parker, J. C., Esq.	Calcutta
1862 May	7.	Partridge, S. B., Esq., M. D.	Calcutta
1871 Dec.	6.	†Peal, S. E., Esq.	Sibsagar, Assam
1867 Mar.	6	Pearimohan Mukarji, M. A., Babu.	Uttarparrah
1860 Feb.	1.	*Pearse, Lieut.-Col. G. G.	Europe
1868 Nov.	4.	†Pearson, C. E., Esq., M. A.	Lahore
1873 Aug.	6.	Pedler, A., Esq.	Calcutta
1869 July	7.	Pell, S. Esq.,	Calcutta
1864 Mar.	2.	Pellew, F. H., Esq., C. S.	Hooghly
1865 Sept.	6.	†Peppé, J. H., Esq.	Ranchi
1868 May	6.	Peterson, F. W., Esq.	Calcutta
1835 July	1.	†Phayre, Major G., Sir A. P., K. C. S. I., C. B.	Europe
1864 Nov.	2.	Phear, The Hon'ble J. B.	Calcutta
1869 Feb.	3.	†Pickford, J., Esq., M. A.	Madras
1868 April	1.	†Pramathanáth Ray, Kumár.	Digapati
1872 Dec.	4.	Prananath Pandit, Babu.	Bhawánipur
1869 Feb.	3.	Pratápachandra Ghosha, B. A.	Calcutta
1871 June	7.	†Pratt, Capt. C. S., Staff-Corps.	Morar, Gwalior
1862 Oct.	8.	†Pulinavihari Sen, Babú.	Berhampore
1856 Mar.	5.	Rājendralála Mitra, Bábú.	Calcutta
1871 June	7.	Rámakrishna Dás, Bábú.	Calcutta
1837 Feb.	1.	Ramánáth Tákur, The Hon'ble Raja.	Calcutta

Date of Election.			
1860 Mar.	7.	†Reid, H. S., Esq., C. S.	Allahabad
1871 July	5.	†Reid, J. R., Esq., C. S.	Azinghur
1872 April	3.	Richards, Dr. V.	Calcutta
1868 April	1.	Robb, G., Esq.	Calcutta
1863 April	1.	†Robertson, C., Esq., C. S.	Mirzapur
1865 Feb.	1.	Robinson, S. H., Esq.	Calcutta
1870 Dec.	7.	Rogers, A., Esq.	Calcutta
1869 July	7.	†Ross, Lieut. J. C., R. E.	Boolundshuhur
1870 Jan.	5	†Ross, Alexander G., Capt. Staff Corps.	Edwardesabad
1871 Sept.	5.	Rundall, Col. F. H., R. E.	Calcutta
1871 Dec.	6.	†Samuells, Capt. W. L.	Hazareebagh
1871 May	3.	Sanderson, C., Esq.	Calcutta
1872 Feb.	7.	†Sashagiri Sastri, M. B. A.	Madras
1870 May	4.	Satyānand Ghoshāl, Rāja.	Calcutta
1873 Jan.	8.	Schlegel, F., Esq.	Calcutta
1870 May	4.	Schlich, Dr. W.	Calcutta
1869 Feb.	3.	Schwendler, L., Esq.	Calcutta
1860 July	4.	†Shelverton, G., Esq.	Waltair, near Vi- zagapatam
1863 April	1.	†Showers, Lieut.-Col. C. L.	Umballa
1866 June	6.	†Sime, J., Esq., B. A.	Delhi
1872 Aug.	7.	*Skrefsrud, Rev. L. O.	Europe
1864 Sept.	7.	†Sladen, Major E. B.	Amherst
1865 July.	5.	Smith, D. Boyes, Esq. M. D.	Calcutta
1864 Mar.	2.	†Spearman, Capt. H. R.	Rangoon
1867 May	1.	†Steel, Capt. E. H., R. A.	Murree
1872 July	3.	†Stephen, Carr, Esq.	Jalandhar
1863 Sept.	2.	†Stewart, R. D., Esq.	Serajgunj
1870 April	6.	Stewart, R., Esq.	Calcutta
1870 Sept.	7.	†St. John, R. T., Esq.	Bassein
1861 Sept.	4.	Stokes, Whitley, Esq.	Calcutta
1863 Nov.	4.	†Stoliczka, F., Esq., Ph. D., F. G. S.	Yarkand
1869 Feb.	3.	*Strachey, The Hon'ble Sir J., K. C. S. I.	Europe
1859 Mar.	2.	†Stubbs, Major F. W., Royal Artillery.	Lucknow
1858 July	7.	†Sutherland, H. C., Esq., B. C. S.	Sylhet
1872 Dec.	4.	†Swetenham, Capt. E.	Prome
1864 Aug.	11.	Swinhoe, W., Esq.	Calcutta
1863 Sept.	3.	Syāmācharan Sarcār, Bābu.	Calcutta
1865 Sept.	6.	Tawney, C. H., Esq., M. A.	Calcutta
1865 April	5.	Taylor, R., Esq.	Calcutta
1860 May	2.	Temple, The Hon'ble Sir R., K.C.S.I., B.C.S.	Calcutta
1859 Mar.	2.	†Theobald, W., Esq., Geological Survey.	Saharanpur
1869 Oct.	6.	†Thomson, A., Esq.	Faizabad
1847 June	2.	Thuillier, Col. H. L., R. A., F. R. S., C. S. I.	Calcutta
1865 July	5.	†Tolbort, T. W. H., Esq., C. S.	Bunnoo
1871 April	5.	*Trefftz, Oscar, Esq.	Europe
1861 June	5.	†Tremlett, J. D., Esq., M. A., C. S.	Moozuffargarh

Date of Election.			
1872 July	3.	Trevor, W. S., Major R. E.	Calcutta
1873 April	2.	Turnbull, R., Esq.	Calcutta
1861 Sept.	4.	Tween, A., Esq., Geological Survey.	Calcutta
1863 May	6.	*Tyler, Dr. J.	Europe
1869 June	2.	†Udayachánd Datt, Bábu.	Nowakhali
1873 April	2.	Umesh Chunder Dutt, Bábu.	Calcutta
1873 May	7.	†Urmston, H. B., Esq.	Rawul Pindi, Panjab
1860 May	2.	*Vanrenen, Major A. D., Bengal Staff Corps.	Europe
1864 Feb.	3.	†Verchère, A. M., Esq., M. D.	Benares
1864 April	6.	Vijayarama Gujapati Ráj Munná Sultán Bahádur, Maharájah Mirza.	Calcutta
1870 June	1.	†Vrindávanachandra Mandala, Bábu.	Balasore
1871 Feb.	1.	†Waagen, Dr. W.	Europe
1873 Jan.	8.	*Wace, Lieut. R.	Europe
1869 Aug.	4.	Wáhid Ali, Princee Jahán Qadr Muhammad Bahádur.	Garden Reach
1865 Nov.	1.	Waldie, D., Esq., F. G. S.	Calcutta
1861 May	1.	†Walker, Col. J. T., R. E., F. R. S.	Delhra Doon
1863 Oct.	7.	Waller, W. K., Esq., M. B.	Calcutta
1862 Jan.	15.	†Ward, G. E., Esq., C. S.	Futtehgarh
1865 May	3.	Waterhouse, Capt. J., B. S. C.	Calcutta
1869 Sept.	1.	†Westland, J., Esq., C. S.	Nagpur
1867 Feb.	6.	†Westmacott, E. V., Esq., B. A., C. S.	Rajmahall.
1862 Oct.	8.	*Wheeler, J. T., Esq.	Europe
1873 April	2.	†White, E., Esq., C. E.	Bijnour
1867 Aug.	7.	†Wileox, F., Esq.	Purulia
1873 Jan.	8.	†Williams, H. C., Esq.	Centl. Provinces
1873 May	7.	†Williams, G. R. C., Esq., C. S.	Muzúffergarh
1867 Jan.	16.	†Williamson, Lieut. W. J.	Garo Hills
1867 Mar.	6.	†Willson, W. G., Esq., B. A.	Calcutta
1871 Mar.	1.	Willson, James, Esq., B. A.	Dacca
1870 Aug.	3.	Wilson, R. H., Esq., C. S.	Calcutta
1866 Mar.	7.	†Wise, Dr. J. F. N.	Dacca
1867 July	3.	†Wood, Dr. J. J.	Ranchi
1870 Jan.	5.	Wood-Mason, J., Indian Museum.	Calcutta
1873 Aug.	6.	†Woodthorpe, Lieut. R. G., R. E.	Shillong
1869 Sept.	1.	Yadulál Mallik, Bábu.	Calcutta
1868 June	3.	Yatandramohan Tagore, Rajah Bahádur.	Calcutta
1867 Mar.	6.	†Yogendranáth Mallik, Bábu.	Andul
1862		*Yule, Col. H. R. E.	Europe

HONORARY MEMBERS.

Date of Election.			
1825 Mar.	9.	M. Garcin de Tassy, Memb. de l'Institut.	Paris
1821 "	6.	Sir John Phillippart.	London
1826 July	1.	Count de Noe.	Paris
1831 "	7.	Prof. C. Lassen.	Bonn
1835 May	6.	Prof. Lea.	Philadelphia
1842 Feb.	4.	Dr. Ewald.	Göttingen
1842 "	4.	Right Hon'ble Sir Edward Ryan, Kt.	London
1843 Mar.	30.	Prof. Jules Mohl, Memb. de l'Institut.	Paris
1847 Sept.	1.	Col. W. Munro.	London
1847 Nov.	3.	His Highness the Nawab Nazim of Bengal.	Murshidabad
1848 Feb.	2.	Dr. J. D. Hooker.	Kew
1848 Mar.	8.	Prof. Henry.	Princeton U. S.
1853 April	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B.	London
1858 July	6.	B. H. Hodgson.	Europe
1859 Mar.	2.	The Hon'ble Sir J. W. Colville, Kt.	Europe
1860 Mar.	7.	Prof. Max Müller.	Oxford
1860 Nov.	7.	Mons. Stanislas Julien.	Paris
1860 "	7.	Dr. Robert Wight.	London
1860 "	7.	Edward Thomas.	London
1860 "	7.	Dr. Aloys Sprenger.	Bern
1860 "	7.	Dr. Albrecht Weber.	Berlin
1868 Feb.	5.	Genl. A. Cunningham, C. S. I.	India
1868 "	5.	Prof. Bâpu Déva Sastri.	Benares
1868 "	5.	Dr. T. Thomson.	London
1868 "	2.	A. Grote.	London
1871 "	7.	Charles Darwin.	London
1872 "	1.	Sir G. B. Airy.	London
1872 June	5.	Prof. T. H. Huxley.	London

CORRESPONDING MEMBERS.

1844 Oct.	2.	Macgowan, Dr. J.	Europe
1856 June	4.	Krämer, Herr A. von.	Alexandria
1856 "	3.	Porter, Rev. J.	Damascus
1856 "	4.	Schlagintweit, Herr H. von.	Munich
1856 "	4.	Smith, Dr. E.	Beyrout
1859 "	4.	Taylor, J., Esq.	Bussorah
1856 "	4.	Wilson, Dr.	Bombay
1857 Mar.	4.	Neitner, J., Esq.	Ceylon
1858 Mar.	3.	Schlagintweit, Herr R. von.	Giesen
1859 Nov.	2.	Frederick, Dr. H.	Batavia
1859 May	4.	Bleeker, Dr. H.	Europe
1860 Feb.	1.	Baker, The Rev. H.	E. Malabar
1860 "	1.	Swinhoe, R., Esq., H. M.'s Consul.	Amoy
1860 April	4.	Haug, Dr. M.	Munich
1861 July	3.	Gösche, Dr. R.	Berlin
1862 Mar.	5.	Murray, A., Esq.	London
1863 July	4.	Barnes, R. H., Esq.	Ceylon
1866 May	7.	Schlagintweit, Prof. E. von.	Munich
1866 "	7.	Sherring, Rev. M. A.	Benares
1868 Feb.	5.	Foucaux, M. F. H.	Paris
1868 "	5.	Holmbœ, Prof.	Christiana

ASSOCIATE MEMBERS.

Date of Election.			
1838 Feb.	7.	Karāmat Ali, Sayyid.	Hooghly
1865 May	3.	Dall, Rev. C. H.	Calcutta

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA
THREE YEARS AND UPWARDS.*

Rule 14, A.—In the event of an Ordinary Member leaving India, and in the further event of his informing the Secretary by letter that he has no intention of returning, but desires to retain his privileges as an Ordinary Member, his subscription shall be 12 Rupees per annum, commutable into a single payment of Rs. 100, provided that if any such Member shall hereafter return to India, he shall thereupon become liable to pay his original subscription, subject to the operation of rule 10 B.

Rule 14, B.—After the lapse of three years from the date of a Member leaving India, if no intimation of his wishes shall, in the interval, have been received by the Society, his name shall be removed from the list of Members.

Date of leaving India.

Adley, C. C. Esq.,	1870
Allardyce, A. Esq.,	1870
Asghar Ali Khān Bahādur, Nawab,	1868
Brandis, Dr. D.,	1871
Cole, Lieut. H. H., R. E.,	1869
Cowell, E. B., Esq.,	1864
Egerton, P. Esq.,	1868
Fytche, Major-Genl. A., C. S. I.,	1871
Gray, R. Esq., M. B.,	1870
Gregory, Capt. J.,	1870
Hyde, E. Esq.,	1871
Innes, F. W. Esq., M. D.,	1871
Latham, G. Esq.,	1870
Lees, Lieut.-Col. W. N.,	1868
Macauliff, M. Esq.,	1871
Neil, Dr. A.,	1871
Oldham, R. A. Esq., C. E.,	1870
Rattray, A. Esq.,	1870
Rogers, Capt. B.,	1870
Saunders, J. O'B. Esq.,	1871
Strachey, Major-Genl. R.,	1871
Thompson, Major G. H.,	1864
Thornton, T. R. Esq.,	1870

* These names will be removed from the next list of members unless intimation is meanwhile received from any of the members of their desire to retain the privileges of ordinary members under the operation of Rule 14 A.

LOSS OF MEMBERS DURING 1873.

BY RETIREMENT.

J. H. Newman, Esq., M. D.	Ajmere
J. C. Geddes, Esq., C. S.	Puri
J. W. Curtoys, Esq.	Calcutta
Rev. J. P. Ashton.	Do.
Dr. C. F. Tonnerre.	Do.
Col. G. H. Saxton.	Ootacamund
Mr. E. VanCutsem.	Calcutta
The Hon'ble Sir R. Couch, Kt.	Do.
H. Woodrow, Esq.	Do.
Col. B. Ford.	Madras
Sultan Muhammad Bashiruddin.	Chinsurah
R. T. H. Griffith, Esq.	Benares
Capt. T. H. Lewin.	Chittagong
The Hon'ble R. Spankie.	Allahabad
Dr. J. B. Baxter.	Sandheads
R. B. Smart, Esq.	Centl. Provinces

BY DEATH.

J. A. P. Colles, Esq., M. D.	Calcutta
V. Irwin, Esq., C. S.	Cuttack
Lieut. J. H. Bourne.	Shillong
W. McLaren Smith, Esq.	Calcutta
N. T. E. Davey, Esq.	Midnapoor
J. L. Stewart, Esq., M. D.	Panjab
Edward Blyth (Hon. Member).	Europe.

ELECTIONS CANCELLED.

C. P. Bird, Esq., C. S.	Hissar
Col. H. Drummond,	Calcutta

[APPENDIX.]

ABSTRACT STATEMENT
OF
RECEIPTS AND DISBURSEMENTS
OF THE
ASIATIC SOCIETY OF BENGAL
FOR
THE YEAR 1873.

STATEMENT

Abstract of the Cash Account

RECEIPTS.				1873.	1872.
ADMISSION FEES.					
Received from Members,	...	Rs. 1,424 0 0		1,424 0 0	768 0 0
SUBSCRIPTIONS.					
Received from Members,	...	8,296 2 0		8,296 2 0	7,551 0 0
PUBLICATIONS.					
Sale proceeds of Journal and Proceedings,	...	368 2 0			
Subscriptions to ditto,	...	1,109 10 6			
Refund of Postage Stamps,	...	8 14 6			
Ditto of Freight,	...	20 7 6			
Ditto of packing charges,	...	1 13 0			
Ditto of Commission from Babu P. C. Ghosha, on sales to the Registrar General's Office,		28 0 9		1,537 0 3	1,276 8 9
LIBRARY.					
Sale proceeds of Books,	...	305 1 0			
Refund of Freight,	...	7 3 0			
Ditto of Postage Stamps,	...	4 2 6		316 6 6	277 2 0
SECRETARY'S OFFICE.					
Commission on purchase of Postage Stamps,		5 15 0			
Saving of Salary,	...	1 10 9			
Received fine, &c.	...	1 10 0		9 3 9	19 11 0
VESTED FUND.					
Interest on the Government Securities from the Bank of Bengal,	...	238 4 0		238 4 0	108 14 0
COIN FUND.					
Sale proceeds of a Gold Moorshedabad Coin,		21 0 0			
Ditto ditto of 3 Copper Taghlak,	...	3 0 0		24 0 0	0 0 0
BUILDING.					
Received from the Right Hon'ble the Secretary of State for India, being the Special House allowance, granted by Government of India from 23rd March, 1871 to 30th November, 1874,	...	12,916 2 1		12,916 2 1	
MISCELLANEOUS.					
Fund account,	...	200 0 0			
O. P. Fund,	...	71 8 2			
Yusuf Ali Moonshee,	...	419 10 0			
A. E. Gough, Esq.	...	0 10 0			
The Hon'ble J. B. Phear,	...	40 0 0			
		731 12 2			
Carried over, Rs. 24,761 2 7					

No. 1.

of the Asiatic Society for 1873.

DISBURSEMENTS.			1873.	1872.
PUBLICATIONS.				
Paid Freight for sending Journal and Proceedings, ...	Rs.	51 3 6		
Ditto Lithographing and Engraving charges, ...	1,453 14 3			
Ditto Printing charges, ...	5,189 10 6			
Ditto Commission on sale of Books, &c. ...	36 14 3			
Ditto Binding charges, ...	13 8 0			
Ditto paper for Plates, ...	247 6 0			
Ditto Subscription to the Hindu Commentator, ...	10 0 0			
Ditto Purchase of Postage Stamps, ...	199 2 4			
Ditto Refund of the amount to Baba P. C. Ghosh, on the sale proceeds from the Registrar General's Office, ...	28 0 9			
Ditto Petty charges, ...	10 7 3			
			7,270 2 10	6,703 8 2
LIBRARY.				
Paid Salary of Librarian, ...	840 0 0			
Ditto Establishment, ...	120 0 0			
Ditto Commission on sale of Books, ...	30 14 3			
Ditto Landing charges, ...	8 9 0			
Ditto Book-binding, ...	259 0 0			
Ditto Subscription to Medical Gazette, ...	15 0 0			
Ditto Salary of Punkha-mau, ...	35 13 3			
Ditto Insufficient Postage, ...	1 1 4			
Ditto Subscription to the Calcutta Review, ...	32 0 0			
Ditto Purchase of Books, ...	149 6 3			
Ditto Bearing Postage, ...	2 5 4			
Ditto Petty charges, ...	24 12 6			
			1,518 13 11	1,344 4 3
SECRETARY'S OFFICE.				
Paid General Establishment, ...	376 0 0			
Ditto Secretary's Establishment, ...	1,679 8 0			
Ditto Purchase of Postage Stamps, ...	113 10 10			
Ditto Stationery, ...	39 10 3			
Ditto Insufficient Postage, ...	5 0 0			
Ditto Meeting charges, ...	148 3 6			
Ditto Commission on Subscriptions collected, ...	21 7 9			
Ditto Salary of Mali, ...	57 0 0			
Ditto Subscription to the Army List, ...	4 0 0			
Ditto ditto Directory, ...	14 0 0			
Ditto Printing charges, ...	33 10 0			
Ditto a Sheet Almanac, ...	1 0 0			
Ditto Advertising charges, ...	14 8 0			
Ditto a Copy of Postage Guide, ...	1 0 0			
Ditto Fee to the Bank of Bengal for Stamp- ing Bank Cheques, ...	1 9 0			
Ditto Repairing Clocks, ...	36 0 0			
Ditto Binding Paper Files, ...	7 8 0			
Ditto ditto Ledgers, ...	15 0 0			
Ditto Freight, ...	5 5 0			
Ditto Petty charges, ...	37 0 0			
			2,614 0 4	2,520 0 1
Carried over, Rs. 11,493 1 1				

RECEIPTS.		1873.		1872.	
	Brought over, Rs.	731 12	2 21,761 2 7		
J. Beames, Esq.	...	37 12 0			
A. M. Markham, Esq.	...	1 4 0			
W. T. Blanford, Esq.	...	49 8 0			
Dr. V. Richards,	...	2 11 0			
Dr. J. F. N. Wise,	...	1 15 0			
Messrs. Trübner and Co.	...	131 8 4			
E. W. Clark, Esq.	...	0 5 9			
The Government of North Western Provinces,	...	13 8 0			
Col. H. Hyde,	...	4 0 0			
Capt. S. B. Miles,	...	0 4 4			
Babu Haris Chandra, Benares, ...	...	5 4 0			
G. Nevill, Esq.	...	5 5 0			
R. A. Barker, Esq.	...	1 2 0			
R. B. Smart, Esq.	...	0 2 0			
M. S. Howell, Esq.	...	0 9 0			
A. V. Nursing Rao, Esq.	...	0 4 0			
Major F. W. Stubbs,	...	4 10 0			
E. T. Atkinson, Esq.	...	4 2 0			
			908 13 10	748 14 3	

Carried over, Rs. 25,760 0 5

DISBURSEMENTS.

1873.

1872.

Brought over, Rs. 11,403 1 1

VESTED FUND.

Purchase of 4½ per cent. Government Securities, ...	5,700	0	0		
Paid Interest on ditto, ...	42	13	3		
Ditto Premium on ditto, ...	215	4	0		
Ditto Commission ditto, ...	14	14	3		
Ditto Fee for renewing Government Securities, ...	2	0	0		
Ditto Commission on collecting Interest on the Government Security, ...	0	9	5		
Ditto a receipt Stamp, ...	0	1	0		
	5,975	9	11	0	4 4

BUILDING.

Paid House rate, ...	396	0	0		
Ditto Police and Lighting rate, ...	210	0	0		
Ditto Water rate, ...	199	15	0		
Fitting drainage and Water-pipe to the Society's Premises, ...	307	12	0		
Repairing outside of ditto, ...	1,839	6	6		
Ditto new works, ...	582	0	0		
Supplying new glasses to the windows, ...	4	1	3		
	3,539	2	6	853	7 3

MISCELLANEOUS.

Subscriptions, ...	200	0	0		
O. P. Fund, ...	600	1	7		
Yusuf Ali Moonshee, ...	543	7	0		
Zoological Garden, ...	26	0	0		
Bank of Bengal Fund account, ...	332	0	0		
Indian Museum, ...	11	2	0		
S. E. Peal, Esq., ...	1	15	0		
The Rev. J. D. Bate, ...	0	9	0		
The Hon'ble J. B. Phear, ...	40	0	0		
J. G. Delmerick, Esq., ...	2	2	0		
The Government North Western Provinces, ...	10	2	0		
J. Beames, Esq., ...	21	6	0		
M. S. Howell, Esq., ...	0	9	0		
A. M. Markham, Esq., ...	15	11	0		
F. S. Growse, Esq., ...	5	7	0		
The Rev. A. T. R. Hoernle, ...	1	7	0		
Dr. J. F. N. Wise, ...	1	3	0		
A. M. Broadley, Esq., ...	39	10	0		
Khwajah Ahsanullah, ...	1	10	0		
The Rev. C. H. Chard, ...	0	6	0		
L. Schwendler, Esq., ...	2	6	0		
R. A. Barker, Esq., ...	1	2	0		
M. Sashagiri Sastri, ...	1	0	0		
E. B. Cowell, Esq., ...	10	8	0		
Messrs. Trubner and Co., ...	0	1	0		
Dr. F. Stoliczka, ...	9	0	0		
J. Wood-Mason, Esq., ...	6	8	0		
* Capt. Raverty, ...	21	3	0		
Major G. E. Fryer, ...	1	0	0		
E. T. Atkinson, Esq., ...	0	12	0		
Sayed Ahmed Khan Bahadoor, ...	0	6	0		
Messrs. Asher and Co., ...	2	0	0		

1,910 9 7

Carried over, Rs. 20,917 13 6

RECEIPTS.

1873.

1871.

Brought over, Rs. 25,760 0 5

BALANCE OF 1872.

In the Bank of Bengal, ...

Cash in hand, ...

... 767 9 4

... 143 15 2

911 8 6

Rs. 26,671 8 11

(Sd.) BUDDINATH BYSACK,
Cashier,
Asiatic Society, Bengal.(Sd.) F. W. PETERSON,
(Sd.) ALEXANDER PEDLER,
Auditors.

DISBURSEMENTS.

1873.

1872.

	Brought over, Rs.	1,910	9	7	20,917	13	6	
Major F. W. Stubbs,	...	...	4	10	0			
D. C. J. Ibbetson, Esq.	...	...	10	12	0			
C. W. Marshall, Esq.	...	...	3	15	0			
The Hon'ble E. C. Bayley,	...	...	0	5	0			
H. C. Williams, Esq.	...	...	0	4	0			
Capt. W. G. Hughes,	...	...	1	0	0			
Capt. J. Butler,	...	...	1	6	0			
John Elliott, Esq.	...	...	0	9	0			
Lecture,	...	...	31	8	6			
Dr. J. M. Foster,	...	...	1	14	0			
						1,966	13	1
						734	10	3
						22,884	10	7
BALANCE.								
In the Bank of Bengal,	...	...	3,392	14	6			
Cash in hand,	...	...	393	15	10			
						3,786	14	4
						Rs. 26,671	8	11
			3,786	14	4			
To be funded for Admis-						(Sd.) BUDDINATH BYSACK,		
sion Fees,	...	1,424	0	0		Cashier,		
						Asiatic Society, Bengal.		
Actual balance available,		2,362	14	4		(Sd.) F. W. PETERSON,		
						(Sd.) ALEXANDER PEDLER,		
						Auditors,		

STATEMENT

Abstract of the Cash Account

RECEIPTS.

ORIENTAL PUBLICATION.	1873.	1872.
Received by Sale of Bibliotheca Indica, ... Rs.	2,776 2 7	
Ditto by Subscription to ditto, ...	128 2 0	
Ditto Refund of Postage and Packing charges,	41 14 8	
Refund of Commission from Babu P. C. Ghosha, on Sale to the Registrar General Office, ...	21 0 6	
	2,970 3 9	2,570 4 8

GOVERNMENT ALLOWANCE.

Received from the General Treasury at 500 Rs. per month, ...	6,000 0 0	
Ditto ditto additional grant for the publication of Sanskrit works, at 250 per month, ...	3,000 0 0	
	9,000 0 0	9,000 0 0
Asiatic Society of Bengal, ...	600 1 7	
Babu Bhaeya Lal, ...	80 0 0	
Thakur Greprasad Sing, ...	14 6 6	
Babu Yogodranarain Rai, ...	26 3 9	
Juggomohun Surma, ...	25 5 6	
K. Jyavier, Esq. ...	0 12 0	
M. Sashagiri Sastri, ...	45 12 0	
Babu Prophullo Chunder Banerjee, ...	1 14 0	
Honuman Row, Esq. ...	0 2 0	
Gopal Row Hary Desha Mookh, ...	0 4 0	
Ramkrishna G. Bhadar Kur, ...	1 2 0	
Sanker P. Pandit, ...	6 14 0	
Pandita Chandra Kanta Tarkalanker, ...	22 12 0	
Babu Harendra Coomar Chaudhury, ...	3 6 0	
J. Woodburn, Esq. ...	5 4 6	
Balwant Rao Govind, ...	4 14 0	
China Tumby, G. W. ...	3 0 0	
Babu Braj Bhushan Das, ...	131 13 0	
F. S. Growse, Esq. ...	1 8 0	
	975 6 10	416 12 6

CONSERVATION OF SANSKRIT MSS.

Received from the Accountant General of Bengal, in part of the amount sanctioned towards the conservation of Sanskrit MSS. being 2nd half of 1872-73, ...	1,550 0 0	
Refund of the amount paid Babu Rajendra Lal Mitra, as advance for purchase of Sanskrit MSS. ...	400 0 0	
Ditto ditto of the ditto paid travelling allowance, ...	25 0 0	
Sale proceeds of 27 copies Notices of Sanskrit MSS. ...	27 0 0	
	2,002 0 0	3,543 0 0

Carried over, Rs. 14,947 10 7

No. 2.

Oriental Publication Fund, 1873.

DISBURSEMENTS.				1873.	1872.
ORIENTAL PUBLICATION.					
Paid Commission on Sale of Books, &c.,	...	476	5 5		
Ditto Packing charges,	...	35	4 0		
Ditto Postage Stamps,	...	105	6 10		
Ditto Freight,	...	87	11 0		
Ditto Advertising charges,	...	400	0 0		
Ditto Insufficient Postage,	...	0	10 0		
Refunded the Commission to Babu P. C. Ghosh, on Sales to the Registrar General's Office,	...	21	0 6		
Petty charges,	...	6	5 0		
				1,132 10 9	959 4 0
LIBRARY.					
Paid Purchase of Sanskrit MSS.	...	372	2 0		
Ditto ditto of Persian MSS.	...	240	0 0		
Ditto ditto of Lithographed or Printed Editions of Sanskrit MSS.	...	165	0 0		
Ditto Petty charges,	...	0	4 0		
				777 6 0	323 14 0
CUSTODY OF ORIENTAL WORKS.					
Paid Salary of the Librarian,	...	360	0 0		
Ditto Establishment,	...	661	8 0		
Ditto Stationery,	...	32	2 0		
Ditto Fee for Stamping Cheques,	...	3	2 0		
Ditto Book-binding,	...	34	4 0		
Ditto Bearing Postage,	...	0	5 0		
Ditto Repairing Glass-Case,	...	6	3 6		
Ditto Binding Ledger,	...	2	0 0		
Ditto Carbolic Acid,	...	20	0 0		
Ditto Printing charges,	...	56	0 0		
Ditto Books cleaning,	...	17	5 3		
Ditto Petty charges,	...	27	12 0		
				1,220 9 9	1,038 4 0
CATALOGUE OF SANSKRIT MSS.					
Paid Salary for Cataloguing Sanskrit MSS., at 30 Rs. per month,	...	360	0 0		
				360 0 0	360 0 0
AKBAENĀMAH.					
Paid Printing charges,	...	496	0 0		
				496 0 0	96 0 0
TAITTIRIYA ARANYAKA OF THE BLACK YAJUR VEDA.					
Paid Printing charges,	...	277	4 0		
				277 4 0	151 8 0
Carried over, Rs.				4,263 14 6	

RECEIPTS.

1873.

1872.

Brought over, Rs. 14,947 10 7

Carried over, Rs. 14,947 10 7

DISBURSEMENTS.		1873.	1872.
Brought over, Rs.		4,263 14 6	
FARHANG-I-RASHID.			
Paid Editing and Printing charges, ...	1,182 8 0	1,182 8 0	1,153 0 0
ĀIN-I-AKBARĪ.			
Paid Editing and Printing charges, ...	619 0 0		
Ditto Preparing an English Index of Persons and things and Geographical Index to First Volume of English Translation of the Āin i Akbari, ...		80 0 0	
		699 0 0	1,021 9 0
CHATURVARGA CHINTAMANI.			
Paid Editing and Printing charges, ...	1,312 12 0	1,312 12 0	1,312 12 0
TABAQĀT I NĀSIRĪ.			
Paid Messrs. Gilbert, Revington, Printers, London, for Printing charges, ...	821 7 9		
Ditto Landing charges, &c., for bringing a box of ditto from the Jetty, ...	6 6 0	827 13 9	533 0 0
SAMA VEDA.			
Paid Editing and Printing charges, ...	1,205 6 6	1,205 6 6	656 6 0
MĀĀSIR I 'ĀLAMGIRĪ.			
Paid Maulawi 'Abdul Hai, for correcting 6½ forms of ditto, ...	25 0 0	25 0 0	445 0 0
SRAUTA SUTRA.			
Paid Editing and Printing charges, ...	435 0 0	435 0 0	
GORĪLYA GRĪHYA SUTRA.			
Paid Editing and Printing, ...	562 12 0	562 12 0	474 0 0
TĀITTIRIYA SANHITYA.			
Paid Editing and Printing charges, &c. ...	342 0 0	342 0 0	956 0 0
PRITHIRAJ RASU.			
Paid Printing charges, ...	236 0 0	236 0 0	
PĀDISHAHNĀMAH.			
Paid Editing and Printing charges, ...	652 14 0	652 14 0	
ATHARVANA UPANISHAD.			
Paid Editing and Printing charges, ...	988 15 0	988 15 0	332 9 0
CHAND'S POEMS.			
Paid Freight and Postage for sending 2 Packages of ditto to the Rev. A. F. R. Hoernle, Benares, ...	2 6 0	2 6 0	34 10 6
SANHITA DARPAṆA.			
Paid Bearing Postage on a Copy of ditto, ...	0 6 0	0 6 0	
COPYING MSS.			
Copying MSS., ...	20 4 0	20 4 0	57 9 0
Carried over, Rs.		12,756 15 9	

RECEIPTS.

1873.

1872.

Brought over, Rs. 14,947 10 7

BALANCE OF 1872.

In the Bank of Bengal, viz.

Conservation of Sanskrit MSS. 3,976 8 5

Dr. J. Muir, ... 898 10 0

O. P. Fund, ... 1,262 8 9

Cash in hand, ... 6,137 11 2

10 8 8

6,148 3 10

Rs. 21,095 14 5

(Sd.) BUDDINATH BYSACK,
Cashier.
Asiatic Society, Bengal.F. W. PETERSON,
ALEXANDER PEDLER,
Auditors.

RECEIPTS.

1873.

1872.

Brought over, Rs. 14,947 10 7

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Rs. 21,095 14 5

(Sd.) BUDDINATH BYSACK,
Cashier.
Asiatic Society, Bengal.F. W. PETERSON,
ALEXANDER PEDLER,
Auditors.

DISBURSEMENTS.

1873.

1872.

	Brought over, Rs.	12,756	15	9
Babu Braj Bhushan Das, ...	...	9	8	6
Kavi Purapa Vencut Ratnam Pantua, ...	...	6	12	0
Babu Bhaiya Lal, ...	...	2	15	0
V. Subbiah, Esq. ...	...	0	3	2
Thakura Giriprasad Singh, ...	...	19	10	0
Jogendranarain Roy, ...	...	3	7	0
Gopal Rao Hury Deshmukh, ...	...	0	4	0
K. Jyavier, Esq. ...	...	0	3	2
Pandita Chandrakanta Tarkalanker, ...	...	1	11	0
Asiatic Society of Bengal, ...	...	71	8	2
M. Sashagiri Sastri, ...	...	44	14	0
F. S. Growse, Esq. ...	...	1	8	0
Balwant Rao Govind, ...	...	7	15	0
		170	7	0

CONSERVATION OF SANSKRIT MSS.

Paid Salary for preparing Catalogue of Sanskrit MSS. ...	...	360	0	0
Ditto ditto for translating the Sanskrit Catalogue, ...	...	240	0	0
Ditto printing charges of Notices of Sanskrit MSS. ...	...	333	8	0
Ditto Postage for sending of ditto ditto, ...	...	16	5	6
Ditto Freight for ditto ditto, ...	...	14	4	0
Ditto Copying MSS. ...	...	55	7	0
Ditto for Stationery, ...	...	74	14	0
Ditto Purchase of Sanskrit MSS. ...	...	290	8	0
Ditto Travelling Pandit as advance for travelling allowance, ...	...	25	0	0
Ditto Packing charges, ...	...	6	12	0
Ditto Salary for travelling Pandit, ...	...	300	0	0
Ditto Printing Paper, ...	...	28	0	0
Ditto reproduced by Photo-Zincography first of the Chaturvarga Hoitra on tinted ground 500 pulls only printing, ...	...	79	0	0
Ditto Baba Rajendralala Mitra, as an advance for Purchase of Sanskrit MSS. ...	...	400	0	0
Ditto a Blank Book in 6 quires for Register of MSS. ...	...	6	8	0
Ditto Travelling allowance, ...	...	10	0	0
Ditto Petty charges, ...	...	3	13	0
		2,244	11	6

BALANCE.

In the Bank of Bengal, viz.

Conservation of Sanskrit MSS. ...	3,733	12	11
Dr. J. Muir, ...	898	10	0
O. P. Fund, ...	1,267	15	5
	5,900	6	4
Cash in hand, ...	23	5	10
	5,923	12	2

Rs. 21,095 14 5

(Sd.) BUDDINATH BYSACK,
Cashier.
Asiatic Society, Bengal.

F. W. PETERSON,
ALEXANDER PEDLER,
Auditors.

STATEMENT No. 3.

Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st Jany. 1874.

ASSETS.		1873.	1872.
CASH.			
In the Bank of Bengal,	Rs. 3,392 14 6	767 9 4	
Cash in hand,	393 15 10	132 15 2	
Government Securities,	7,700 0 0	2,000 0 0	
	11,486 14 4	2,911 8 6	
OUTSTANDING.			
Admission fees,	384 0 0	320 0 0	
Subscription,	6,733 7 0	5,685 9 0	
Sale of Journal,	413 13 6	357 9 0	
Subscription of ditto,	688 12 9	796 2 9	
Sale of Library Books,	520 1 0	390 7 0	
	8,740 2 3	7,549 11 9	
O. P. Fund,	641 1 5	112 8 0	
Bank of Bengal Fund account,	332 0 0	0 0 0	
	Rs. 9,713 3 8	7,662 3 9	
LIABILITIES.			
Salary and Establishment, ...	Rs. 262 6 8		
Baptist Mission Press, Printing charges.			
Journal Part I, No. 3 and	888 10 0		
Part II, No. 3 of 1873,	34 13 3		
Tratto Paper for ditto, ...			
Ditto Printing charges—			
Proceedings, No. VII and	198 4 0		
No. VIII of 1873, ...	1,121 11 3		
Add—			
Proceedings, Nos. IX and X,	290 0 0		
Journal Parts I and II of			
No. 4, ...	900 0 0		
	1,100 0 0		

Rs. 2,574 1 11

F. W. PETERSON,
ALEXANDER PEDLER.

*Shewing the Assets and Liabilities of the Asiatic Society of Bengal O. P. F. on the
1st January, 1874.*

PLATE XXVII

F. W. PETERSON,
ALEXANDER PEDLER.

STATEMENT No. 5.

Conservation of Sanskrit MSS. in Account Current with the Asiatic Society of Bengal.

Cr.		Dr.	
	1873.		
Balance of 1872, ...	Rs. 3,976 8 5	Amount spent in 1873, ...	Rs. 2,244 11 6
Received from the Government of Bengal, being the half sum sanctioned annually Rs. 3,100, towards Conservation and Publication of Sanskrit MSS. for the second half of 1872-73, ...	1,550 0 0	Balance, " " ...	3,733 12 11
Refund of the amount paid Babu R. L. Mitra, as advance for purchase of Sanskrit MSS. on the 13th September, 1873, ...	400 0 0		5,978 8 5
Ditto ditto paid travelling Pandit, as advance for travelling allowance on the 2nd April, 1873, ...	25 0 0		
Sale proceeds of 27 copies of Notices of Sanskrit MSS. ...	27 0 0		
	5,978 8 5		
	Rs. 5,978 8 5		

F. W. PETERSON,
ALEXANDER PEDLER,

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1873.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.002	30.073	29.925	0.148	73.1	81.5	66.8	14.7
2	29.990	.056	.930	.126	74.4	82.7	66.5	16.2
3	30.013	.076	.957	.119	73.9	78.6	70.4	8.2
4	29.996	.071	.931	.140	72.8	80.4	67.5	12.9
5	.990	.049	.950	.099	71.9	80.5	63.1	17.4
6	30.019	.092	.978	.114	71.8	80.0	64.8	15.2
7	.024	.098	.965	.133	72.8	80.6	66.5	14.1
8	.036	.120	.979	.141	71.0	77.2	66.8	10.4
9	.032	.103	.968	.135	71.8	81.5	64.6	16.9
10	.051	.131	.991	.140	72.7	82.5	64.5	18.0
11	.062	.110	30.017	.093	72.3	78.0	69.0	9.0
12	.093	.160	.034	.126	73.8	80.0	70.0	10.0
13	.089	.177	.025	.152	69.9	77.8	63.0	14.8
14	.044	.122	29.974	.148	68.4	77.0	61.9	15.1
15	.066	.130	30.019	.111	68.7	78.5	61.0	17.5
16	.107	.180	.058	.122	69.7	78.4	62.5	15.9
17	.119	.197	.060	.137	69.6	78.0	61.5	16.5
18	.059	.146	29.980	.166	69.6	78.4	62.5	15.9
19	.000	.086	.944	.142	69.3	78.5	61.6	16.9
20	29.996	.079	.938	.141	69.4	78.3	62.2	16.1
21	30.055	.137	30.001	.136	69.1	78.5	61.0	17.5
22	.072	.140	.023	.117	67.5	76.5	59.0	17.5
23	.051	.139	29.989	.150	68.0	77.5	60.9	16.6
24	29.996	.066	.933	.133	67.8	78.0	60.0	18.0
25	30.004	.080	.955	.125	66.9	77.8	57.5	20.3
26	.009	.086	.958	.128	67.6	78.3	58.0	20.3
27	29.966	.064	.897	.167	68.1	79.6	58.5	21.1
28	.911	29.985	.862	.123	69.8	80.0	61.5	18.5
29	.951	30.013	.898	.115	67.3	74.0	61.2	12.8
30	30.004	.087	.946	.141	63.6	71.5	57.8	13.7
31	.015	.095	.954	.141	63.4	73.3	55.5	17.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1873.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	68.2	4.9	64.3	8.8	0.603	6.60	2.19	0.75
2	69.7	4.7	66.4	8.0	.646	7.06	.09	.77
3	67.4	6.5	62.8	11.1	.574	6.27	.74	.70
4	64.5	8.3	57.9	14.9	.488	5.33	3.38	.61
5	63.1	8.8	56.1	15.8	.459	.03	.45	.59
6	63.6	8.2	57.0	14.8	.473	.18	.27	.61
7	64.6	8.2	58.0	14.8	.489	.34	.37	.61
8	63.1	7.9	56.8	14.2	.470	.16	.09	.63
9	64.5	7.3	58.7	13.1	.501	.94	2.96	.65
10	67.5	5.2	63.3	9.4	.584	6.39	.29	.74
11	69.8	2.5	67.8	4.5	.677	7.41	1.17	.86
12	68.3	5.5	64.4	9.4	.605	6.62	2.36	.74
13	63.3	6.6	58.0	11.9	.489	5.38	.60	.67
14	61.2	7.2	55.4	13.0	.449	4.95	.67	.65
15	62.3	6.4	57.2	11.5	.476	5.24	.45	.68
16	62.6	7.1	56.9	12.8	.472	.18	.75	.65
17	63.5	6.1	58.6	11.0	.499	.50	.40	.70
18	63.8	5.8	59.2	10.4	.509	.62	.28	.71
19	63.8	5.5	59.4	9.9	.513	.64	.19	.72
20	63.4	6.0	58.6	10.8	.499	.50	.36	.70
21	61.9	7.2	56.1	13.0	.459	.06	.72	.65
22	60.2	7.3	54.4	13.1	.434	4.79	.63	.65
23	61.3	6.7	55.9	12.1	.456	5.04	.49	.67
24	61.2	6.6	55.9	11.9	.456	.04	.44	.67
25	60.2	6.7	54.8	12.1	.440	4.86	.42	.67
26	61.4	5.2	56.4	11.2	.464	5.12	.32	.69
27	62.9	5.2	58.7	9.4	.501	.54	.01	.73
28	64.4	5.4	60.1	9.7	.525	.77	.18	.73
29	62.5	4.8	58.7	8.6	.501	.54	1.83	.75
30	58.2	5.7	53.1	10.8	.415	4.63	2.00	.70
31	58.2	5.2	53.5	9.9	.421	.69	1.84	.72

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1873.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.032	30.123	29.916	0.207	66.7	73.4	60.0	13.4
1	.023	.113	.906	.207	66.1	73.2	58.8	14.4
2	.014	.107	.901	.206	65.4	72.7	58.0	14.7
3	.004	.101	.893	.208	64.8	72.0	57.5	14.5
4	.002	.115	.895	.220	64.2	71.8	57.0	14.8
5	.014	.125	.910	.215	63.7	71.0	56.0	15.0
6	.030	.138	.923	.215	63.2	70.8	55.5	15.3
7	.050	.148	.936	.212	62.9	70.4	55.5	14.9
8	.074	.172	.963	.209	64.6	71.0	56.5	14.5
9	.098	.197	.985	.212	68.4	73.5	61.2	12.3
10	.100	.195	.964	.231	71.8	77.5	64.3	13.2
11	.081	.175	.946	.229	64.6	80.5	66.3	14.2
Noon.	.050	.138	.921	.217	76.3	81.2	68.3	12.9
1	.017	.106	.906	.200	77.5	82.5	70.0	12.5
2	29.990	.079	.892	.187	78.1	82.7	70.3	12.4
3	.976	.065	.862	.203	78.3	82.5	71.5	11.0
4	.970	.060	.862	.198	76.9	81.3	70.0	11.3
5	.976	.071	.863	.208	75.4	79.5	69.0	10.5
6	.990	.077	.874	.203	73.0	78.0	66.4	11.6
7	30.006	.098	.886	.212	71.3	76.7	65.0	11.7
8	.022	.119	.902	.217	70.0	76.0	63.5	12.5
9	.036	.136	.916	.220	68.8	75.5	62.5	13.0
10	.043	.129	.925	.204	67.8	74.5	61.5	13.0
11	.038	.131	.920	.211	67.1	74.0	60.5	13.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1873.*

Hourly Means, &c.* of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	63.0	3.7	60.0	6.7	.523	5.79	1.44	.80
1	62.4	3.7	59.4	6.7	.513	.68	.42	.80
2	61.8	3.6	58.9	6.5	.504	.59	.36	.80
3	61.3	3.5	58.5	6.3	.498	.53	.30	.81
4	60.8	3.4	57.7	6.5	.485	.38	.31	.80
5	60.3	3.4	57.2	6.5	.476	.29	.30	.80
6	60.0	3.2	57.1	6.1	.475	.30	.19	.82
7	59.7	3.2	56.8	6.1	.470	.25	.18	.82
8	60.6	4.0	57.4	7.2	.480	.33	.45	.79
9	62.2	6.2	57.2	11.2	.476	.25	2.37	.69
10	63.8	8.0	57.4	14.4	.480	.26	3.19	.62
11	65.3	9.3	58.8	15.8	.503	.47	.73	.60
Noon.	65.8	10.5	58.4	17.9	.496	.38	4.31	.56
1	66.2	11.3	58.3	19.2	.494	.35	.69	.53
2	66.3	11.8	58.0	20.1	.489	.29	.93	.52
3	66.4	11.9	58.1	20.2	.491	.31	.97	.52
4	66.0	10.9	58.4	18.5	.496	.37	.49	.56
5	66.0	9.4	59.4	16.0	.513	.58	3.85	.58
6	66.2	6.8	60.8	12.2	.537	.88	2.88	.67
7	65.5	5.8	60.9	10.4	.539	.92	.41	.71
8	65.0	5.0	61.0	9.0	.541	.95	.05	.74
9	64.3	4.5	60.7	8.1	.536	.90	1.81	.77
10	63.6	4.2	60.2	7.6	.527	.82	.66	.78
11	63.2	3.9	60.1	7.0	.525	.81	.51	.79

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles.	
1	125.0	...	ENE	...	44.2	¶i & ¶i to 3 p. m. B to 11 p. m. Slightly foggy at 6 & 7 a. m.
2	132.8	...	E by N & ENE	...	97.9	B to 6 a. m., ¶i to 11 a. m., ¶i to 4 p. m., ¶i to 11 p. m.
3	102.0	...	ENE & NE	...	151.6	¶i to 2 a. m. O to 11 p. m. D at 3 p. m.
4	123.0	...	NE & N	0.5	174.6	¶i to 9 a. m., ¶i to 7 p. m., ¶i to 11 p. m.
5	130.0	...	NE & N	...	168.2	¶i & ¶i
6	124.2	...	NNE & NE	...	175.3	¶i
7	129.0	...	N E	...	127.0	¶i to 10 a. m., ¶i to 11 p. m.
8	127.7	...	NE & ENE	...	98.6	¶i to 3 a. m. O to 5 a. m., ¶i to 10 a. m., ¶i to 3 p. m., ¶i to 5 p. m. B to 11 p. m.
9	132.5	...	ENE	...	65.6	B to 3 a. m., ¶i to 7 a. m. B to 11 a. m. ¶i to 6 p. m. B to 11 p. m. Slightly foggy from 7 to 9 p. m.
10	132.0	...	E by N, E, & S	...	75.8	B to 8 a. m., ¶i to 2 p. m. ¶i to 4 p. m. B to 11 p. m.
11	118.5	0.82	S, ESE & ENE	...	96.2	S to 5 a. m. O to 11 p. m. R from 9½ to 11 a. m. & at 4½, 8, & 9 p. m.
12	126.0	...	ENE	...	107.5	O to 1 a. m., ¶i to 8 a. m. B to 11 p. m.
13	130.0	...	ENE & N by W	...	121.2	B.
14	130.0	...	NNW & N by W	...	126.0	B.
15	129.0	...	NNW & ENE	...	121.9	B to 4 p. m., ¶i to 6 p. m., B to 11 p. m.
16	131.5	...	ENE	...	113.7	B to 6 a. m., ¶i to 5 p. m. B to 11 p. m.
17	131.5	...	ENE	...	84.2	B to 5 a. m., ¶i to 10 a. m. B to 4 p. m., ¶i to 9 p. m. B to 11 p. m. Slightly foggy at 5 & 6 a. m. & 9 & 10 p. m.
18	130.0	...	ENE	...	73.4	B to 6 a. m. ¶i to 6 p. m. B to 11 p. m. Slightly foggy at 10 & 11 p. m.

¶i Cirri, —i Strati, ¶i Cumuli, ¶i Cirro-strati, ¶i Cumulo-strati, ¶i Nimbi, ¶i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1873.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
19	130.5	...	E N E	...	77.9	B to 11 A. M., ~i to 1 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M.
20	133.4	...	E N E & N E	...	62.5	B to 11 A. M., ~i to 3 P. M. B to 11 P. M.
21	132.5	...	N E	0.4	116.8	B to 12 A. M., ~i to 2 P. M. B to 11 P. M. Slightly foggy at 6 & 7 A. M.
22	127.0	...	N E & N N W	...	42.7	B.
23	128.0	...	N & N E	...	199.9	B to 12 A. M., ~i to 3 P. M. B to 11 P. M.
24	131.7	...	N E	...	149.1	B.
25	130.0	...	N E & E	...	81.5	B. Slightly foggy from at 7 & 8 A. M.
26	133.7	...	E	...	56.5	B. Slightly foggy from 6 to 8 A. M. & 7 to 11 P. M.
27	129.0	...	E & S W	...	47.1	B. Slightly foggy from 5 to 7 A. M.
28	136.0	...	S W & S S W	...	117.5	B to 1 P. M., ~i to 4 P. M. B to 8 P. M., ~i to 11 P. M.
29	125.5	...	S S W, N N W & N	...	138.7	~i to 6 A. M. B to 12 A. M. ~i to 5 P. M. B to 11 P. M.
30	128.0	...	N N E & N by W	...	143.7	B. Slightly foggy from 9 to 11 P. M.
31	127.0	...	N by W & W N W	...	89.3	B. Slightly foggy at midnight & 1 from 6 to 10 A. M. & 8 to 11 P. M.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning
R. rain, D drizzle.

Meteorological Observations.

c

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1873.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	30.027
Max. height of the Barometer occurred at 9 A. M. on the 17th ...	30.197
Min. height of the Barometer occurred at 3 & 4 P. M. on the 28th ...	29.862
Extreme range of the Barometer during the month	0.335
Mean of the daily Max. Pressures	30.102
Ditto ditto Min. ditto	29.969
Mean daily range of the Barometer during the month	0.133

	°
Mean Dry Bulb Thermometer for the month	69.9
Max. Temperature occurred at 2 P. M. on the 2nd	82.7
Min. Temperature occurred at 6 & 7 A. M. on the 31st	55.5
Extreme range of the Temperature during the month	27.2
Mean of the daily Max. Temperature	78.5
Ditto ditto Min. ditto,	62.8
Mean daily range of the Temperature during the month	15.7

Mean Wet Bulb Thermometer for the month	63.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.3
Computed Mean Dew-point for the month	58.6
Mean Dry Bulb Thermometer above computed mean Dew-point	11.3

	Inches.
Mean Elastic force of Vapour for the month	0.499

	Troy grain.
Mean Weight of Vapour for the month	5.50
Additional Weight of Vapour required for complete saturation ...	2.48
Mean degree of humidity for the month, complete saturation being unity	0.69

	°
Mean Max. Solar radiation Thermometer for the month	128.3

	Inches.
Rained 2 days.—Max. fall of rain during 24 hours	0.82
Total amount of rain during the month	0.82
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	0.73
Prevailing direction of the Wind E. N. E. & N E.	

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Dec. 1873.

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MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on. N. by E.	Rain on. N. N. E.	Rain on. N. E.	Rain on. E. N. E.	Rain on. E. by N.	Rain on. E.	Rain on. E. by S.	Rain on. E. S. E.	Rain on. S. E.	Rain on. S. S. E.	Rain on. S. by E.	Rain on. S.	Rain on. S. by W.	Rain on. S. S. W.	Rain on. S. W.	Rain on. W. S. W.	Rain on. W. by S.	Rain on. W.	Rain on. W. by N.	Rain on. W. N. W.	Rain on. N. W.	Rain on. N. N. W.	Rain on. N. by W.	Rain on.
Mid night		2	1	7	10	12	12							1		1	1						3	1	
1		1	1	2	10	12	12						1		1	1						3	1	1	
2				2	10	12	12						1		1	1						3	1	1	
3				2	10	12	12						1		1	1						3	1	1	
4	1			2	10	12	12						1		1	1						3	1	1	
5	1			2	9	12	12						1		1	1						3	1	1	
6	1			2	9	12	12						1		1	1						3	1	1	
7	1			2	9	12	12	1	1						1	1						4	1	1	
8	1			10	8	12	12	1	1						1	1						1	1	1	
9	1		1	9	10	12	12	1	1						1	1						4	1	1	
10	1			12	9	12	12	1	1	1					1	1						1	1	1	
11	2	1		10	8	12	12	1	1	1					1	1						1	1	1	
Noon.	1	1		8	12		3						1			1	1					2	1	1	
1	2			8	12	1	12								1	1						2	1	1	
2	2	1		9	11	1	12								1	1						2	1	1	
3	1	1	1	8	10	1	12								1	1						1	1	1	
4	4			8	9		12								1	1						1	1	1	
5	12			6	10	1	12								1	1						1	1	1	
6	12			6	11		12								1	1						1	1	1	
7	12			6	11		12								1	1						1	1	1	
8	12			6	11	1	12								1	1						1	1	1	
9	12			6	11	1	12								1	1						1	1	1	
10	1	1		7	10	1	12								1	1						1	1	1	
11	1	1	1	7	10	1	12								1	1						1	1	1	

Meteorological Observations.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	30.012	30.096	29.956	0.140	64.9	75.4	56.5	18.9
2	29.993	.068	.930	.138	67.1	77.8	57.3	20.5
3	30.002	.066	.946	.120	69.9	79.5	63.6	15.9
4	.093	.166	30.025	.141	68.2	76.8	62.2	14.6
5	.121	.197	.059	.138	64.5	73.6	56.0	17.6
6	.092	.160	.035	.125	61.9	71.8	53.6	18.2
7	.100	.191	.037	.154	61.0	72.0	52.5	19.5
8	.110	.199	.067	.132	61.7	74.0	51.8	22.2
9	.080	.178	.004	.174	62.3	74.8	51.4	23.4
10	.060	.159	.004	.155	65.3	78.5	54.0	24.5
11	.019	.110	29.947	.163	69.0	81.0	59.5	21.5
12	29.957	.036	.905	.131	71.9	81.5	62.7	21.8
13	.932	29.999	.869	.130	68.2	75.0	62.5	12.5
14	30.013	30.086	.945	.141	61.4	70.0	53.6	16.4
15	.050	.137	30.003	.134	61.0	72.5	51.5	21.0
16	.056	.121	.008	.113	63.3	75.0	53.4	21.6
17	.100	.171	.052	.119	65.9	76.6	57.0	19.6
18	.156	.229	.088	.141	65.2	76.0	54.5	21.5
19	.161	.249	.094	.155	63.6	75.0	55.0	20.0
20	.114	.177	.047	.130	64.6	75.7	56.0	19.7
21	.101	.181	.034	.147	67.4	78.5	57.7	20.8
22	.045	.129	29.967	.162	69.9	80.0	61.0	19.0
23	.005	.077	.946	.131	72.5	82.5	65.5	17.0
24	29.977	.055	.906	.149	72.3	82.1	66.0	16.1
25	30.001	.079	.931	.148	63.6	68.0	60.2	7.8
26	.062	.140	30.005	.135	64.8	74.0	58.3	15.7
27	.101	.167	.048	.119	65.4	74.2	56.5	17.7
28	.062	.140	29.974	.166	66.9	76.3	58.0	18.3
29	29.994	.061	.931	.130	69.7	78.5	61.0	17.5
30	.928	29.991	.836	.155	71.8	80.6	65.8	14.8
31	.959	30.029	.876	.153	73.1	81.0	66.6	14.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	59.2	5.7	54.6	10.3	0.437	4.86	1.99	0.71
2	62.6	4.5	59.0	8.1	.506	5.60	.72	.77
3	65.4	4.5	61.8	8.1	.555	6.11	.87	.77
4	61.1	7.1	55.4	12.8	.449	4.95	2.63	.65
5	57.0	7.5	51.0	13.5	.386	.30	.46	.64
6	54.2	7.7	47.3	14.6	.340	3.80	.43	.61
7	53.7	7.3	47.1	13.9	.338	.78	.28	.62
8	54.5	7.2	48.0	13.7	.349	.90	.29	.63
9	55.7	6.6	49.8	12.5	.371	4.14	.17	.66
10	58.4	6.9	52.9	12.4	.412	.59	.31	.66
11	63.2	5.8	58.6	10.4	.499	5.51	.25	.71
12	66.1	5.8	61.5	10.4	.550	6.04	.44	.71
13	60.9	7.3	55.1	13.1	.414	4.91	.67	.65
14	52.4	9.0	41.3	17.1	.307	3.44	.70	.56
15	53.6	7.4	46.9	14.1	.336	.76	.30	.62
16	57.1	6.2	51.5	11.8	.393	4.38	.13	.67
17	60.2	5.7	55.6	10.3	.452	5.02	.04	.71
18	57.4	7.8	51.2	14.0	.389	4.33	.58	.63
19	56.2	7.4	49.5	14.1	.367	.09	.48	.62
20	58.3	6.3	53.3	11.3	.418	.66	.12	.69
21	62.5	4.9	58.6	8.8	.449	5.52	1.87	.75
22	64.6	5.3	60.4	9.5	.530	.83	2.15	.73
23	68.7	3.8	65.7	6.8	.632	6.92	1.71	.80
24	68.7	3.6	65.8	6.5	.634	.94	.64	.81
25	61.7	1.9	60.0	3.6	.523	5.82	0.75	.89
26	61.4	3.4	58.7	6.1	.501	.57	1.26	.82
27	61.1	4.3	57.7	7.7	.485	.37	.58	.77
28	61.8	5.1	57.7	9.2	.485	.36	.92	.74
29	65.0	4.7	61.2	8.5	.511	.99	.94	.76
30	69.0	2.8	66.8	5.0	.655	7.19	.26	.85
31	70.7	2.4	68.8	4.3	.699	.65	.14	.87

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.053	30.196	29.925	0.271	62.5	70.5	55.5	15.0
1	.013	.180	.907	.273	61.8	70.0	54.8	15.2
2	.034	.162	.894	.268	61.1	69.5	54.2	15.3
3	.024	.148	.878	.270	60.5	68.8	53.3	15.5
4	.017	.138	.869	.269	59.9	68.2	52.7	15.5
5	.028	.149	.882	.267	59.3	67.7	52.0	15.7
6	.042	.169	.897	.272	58.7	67.5	51.5	16.0
7	.061	.184	.916	.268	58.4	66.6	51.4	15.2
8	.088	.215	.962	.253	59.9	68.3	53.0	15.3
9	.115	.241	.983	.258	61.4	72.0	58.0	14.0
10	.122	.249	.991	.258	68.3	75.6	63.0	12.6
11	.105	.223	.974	.249	71.3	77.0	64.3	12.7
Noon.	.077	.193	.945	.248	73.4	79.6	63.8	15.8
1	.013	.158	.911	.247	74.6	82.7	63.0	19.7
2	.018	.130	.882	.248	75.7	83.6	62.2	21.4
3	.000	.104	.854	.250	76.2	84.5	61.8	22.7
4	29.990	.095	.836	.259	74.8	83.0	61.0	22.0
5	.995	.094	.876	.218	73.1	81.2	61.0	20.2
6	30.009	.116	.890	.226	70.4	76.6	61.5	15.1
7	.026	.141	.903	.238	68.4	74.6	61.2	13.4
8	.045	.168	.920	.248	66.9	74.0	60.5	13.5
9	.060	.196	.939	.257	65.7	73.5	58.7	14.8
10	.067	.209	.937	.272	64.6	72.0	57.3	14.7
11	.062	.200	.939	.261	63.5	71.0	56.8	14.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	59.3	3.2	56.4	6.1	0.464	5.18	1.17	0.82
1	58.8	3.0	56.1	5.7	.459	.14	.07	.83
2	58.2	2.9	55.6	5.5	.452	.06	.02	.83
3	57.7	2.8	55.2	5.3	.445	.00	0.97	.84
4	57.3	2.6	55.0	4.9	.442	4.97	.88	.85
5	56.9	2.4	54.7	4.6	.438	.92	.82	.86
6	56.4	2.3	54.3	4.4	.432	.87	.77	.86
7	56.1	2.3	54.0	4.4	.428	.82	.76	.86
8	57.1	2.8	54.6	5.3	.437	.91	.94	.84
9	59.9	4.5	55.8	8.6	.455	5.06	1.68	.75
10	61.9	6.4	56.8	11.5	.470	.18	2.42	.68
11	63.0	8.3	56.4	14.9	.464	.08	3.25	.61
Noon.	63.6	9.8	55.8	17.6	.455	4.96	.91	.56
1	63.8	10.8	56.2	18.4	.461	5.02	4.18	.55
2	64.4	11.3	56.5	19.2	.465	.06	.45	.53
3	64.4	11.8	56.1	20.1	.459	4.99	.67	.52
4	63.5	11.3	55.6	19.2	.452	.93	.33	.53
5	63.6	9.5	56.0	17.1	.458	5.00	3.79	.57
6	63.8	6.6	58.5	11.9	.498	.47	2.63	.68
7	63.1	5.3	58.9	9.5	.504	.56	.06	.73
8	62.2	4.7	58.4	8.5	.496	.48	1.80	.75
9	61.5	4.2	58.1	7.6	.491	.44	.58	.78
10	60.8	3.8	57.8	6.8	.486	.40	.38	.80
11	60.1	3.4	57.0	6.5	.473	.27	.28	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1 1/2 ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
1	130.0	...	W N W & N E	...	70.2	B. Foggy from midnight to 7 A. M. & 7 to 11 P. M.
2	135.5	...	S S E & S by W	...	50.8	B to 11 A. M., ~i to 4 P. M. B to 11 P. M. Foggy from 2 to 8 A. M.
3	131.2	...	S by W & N by E	...	106.7	B to 4 A. M., ~i to 8 A. M., ~i to 1 P. M. B to 8 P. M., ~i to 11 P. M.
4	127.8	...	E N E & N N E	...	146.1	~i to 4 A. M. B to 11 P. M. Slightly foggy at 11 P. M.
5	127.0	...	N N E & N by W	...	143.4	B Slightly foggy at 6 A. M. & from 8 to 10 P. M.
6	130.6	...	N by E & N N W	...	140.1	B to 1 P. M., ~i to 6 P. M. B to 11 P. M.
7	127.6	...	N by E & N W	...	145.7	B to 2 P. M., ~i to 4 P. M. B to 11 P. M.
8	128.8	...	N W & N E	...	138.1	B to 4 P. M., ~i to 8 P. M. B to 11 P. M. Slightly foggy from 7 to 11 P. M.
9	129.0	...	N E	...	99.4	B. Slightly foggy from 5 to 7 A. M. & 9 to 11 P. M.
10	129.0	...	N E	...	63.8	B Foggy from midnight to 8 A. M. & at 7 & 8 P. M.
11	132.0	...	S & N W	...	99.9	B to 11 A. M., ~i to 5 P. M. B to 11 P. M. Slightly foggy from 6 to 8 A. M.
12	135.0	...	S S W	...	86.5	B to 3 P. M., ~i to 8 P. M. B to 11 P. M. Foggy from 2 to 8 A. M.
13	124.0	...	S S W & N W	1.0	174.7	B.
14	126.0	...	N N E & N W	0.4	170.9	B. Slightly foggy from 7 to 11 P. M.
15	130.0	...	W S W & N W	...	88.7	B. Slightly foggy from 8 to 11 P. M.
16	129.8	...	W by S & W by N	...	80.7	B. Slightly foggy at 6 & 7 A. M.
17	135.0	...	S S W & W	...	89.9	B to 11 A. M., ~i to 5 P. M. B to 11 P. M.
18	133.0	...	NNW, N & ENE	...	118.8	B to 7 A. M., ~i to 12 A. M. B to 11 P. M.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi, ~i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Mile.	
19	126.0	...	E N E & W N W	...	92.3	B to 5 A. M., \i to 7 A. M. B to 11 P. M. Slightly foggy at 11 P. M.
20	121.0	...	W N W & W by S	...	114.8	Chiefly B Slightly foggy at midnight 1 A. M. & 11 P. M.
21	131.0	...	W by S, N & N W	...	74.7	B to 11 A. M., \i to 6 P. M., B to 11 P. M. Slightly foggy at midnight 1 from 6 to 8 A. M. & 7 to 11 P. M.
22	133.0	...	S W & W N W	...	76.4	B to 7 A. M., \i to 11 A. M., \i to 5 P. M. B to 11 P. M. Foggy at midnight & from 5 to 10 A. M.
23	135.6	...	S W	...	109.1	B to 6 A. M., \i to 9 A. M. \i to 4 P. M., \i to 11 P. M. Foggy from 2 to 9 A. M.
24	134.2	...	S W & S S W	...	149.3	B to 8 A. M., \i to 4 P. M. B to 11 P. M. Slightly foggy from 5 to 8 A. M.
25		0.49	S S W, N & E by N	1.0	189.0	B to 1 A. M., \i to 4 A. M. O to 4 P. M., \i to 11 P. M. Slight R from 10 A. M. to 4 P. M.
26	135.0	...	E by N & Variable	...	96.3	B to 9 A. M., \i to 12 A. M., \i to 7 P. M. B to 9 P. M., \i to 11 P. M.
27	129.0	...	E N E & N E	...	84.5	\i to 1 A. M. B to 7 A. M., \i to 11 P. M. Foggy at 6 & 7 A. M. & from 7 to 10 P. M.
28	125.5	...	N E, E N E & W	...	92.6	B to 3 P. M., \i to 6 P. M. B to 11 P. M. Foggy at 8 & 9 P. M.
29	134.8	...	S W & Variable	...	64.9	B to 9 A. M., \i to 2 P. M., \i to 11 P. M. Slightly foggy from 6 to 8 A. M.
30	132.0	0.22	S S W & S W	2.4	119.4	\i & \i to 5 A. M. O to 9 A. M., \i to 4 P. M. O to 11 P. M. L on S at 10 P. M. T & R at 5 P. M.
31	125.0	0.23	S W & W S W	...	115.3	Scuds to 2 A. M. O to 11 A. M., \i to 3 P. M. O to 11 P. M. T, L & Slight R from 5½ to 10½ P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of January 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ...	30.047
Max. height of the Barometer occurred at 10 A. M. on the 19th ...	30.249
Min. height of the Barometer occurred at 4 P. M. on the 30th ...	29.836
Extreme range of the Barometer during the month ...	0.413
Mean of the daily Max. Pressures ...	30.124
Ditto ditto Min. ditto ...	29.983
Mean daily range of the Barometer during the month ...	0.141

	°
Mean Dry Bulb Thermometer for the month ...	66.4
Max. Temperature occurred at 3 P. M. on the 12th ...	84.5
Min. Temperature occurred at 7 A. M. on the 9th ...	51.4
Extreme range of the Temperature during the month ...	33.1
Mean of the daily Max. Temperature ...	76.5
Ditto ditto Min. ditto ...	58.1
Mean daily range of the Temperature during the month ...	18.4

Mean Wet Bulb Thermometer for the month ...	60.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.7
Computed Mean Dew-point for the month ...	56.1
Mean Dry Bulb Thermometer above computed mean Dew-point ...	10.3

	Inches.
Mean Elastic force of Vapour for the month ...	0.459

	Troy grain.
Mean Weight of Vapour for the month ...	5.10
Additional Weight of Vapour required for complete saturation ...	2.07
Mean degree of humidity for the month, complete saturation being unity ...	0.71

	°
Mean Max. Solar radiation Thermometer for the month ...	130.1

	Inches.
Rained* 3 days,—Max. fall of rain during 24 hours ...	0.49
Total amount of rain during the month ...	0.94
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ...	0.82
Prevailing direction of the Wind ... N. E. & S. W.	

Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fohr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.049	30.117	29.965	0.152	68.2	72.0	64.5	7.5
2	.052	.141	.984	.157	70.0	76.5	64.5	12.0
3	.037	.105	.978	.127	71.0	77.2	67.0	10.2
4	.037	.130	.961	.169	70.5	78.4	62.2	16.2
5	.000	.094	.920	.174	67.4	72.0	63.7	8.3
6	29.945	.015	.896	.119	64.8	69.0	61.5	7.5
7	.932	.011	.887	.124	66.1	72.3	62.8	9.5
8	.973	.055	.926	.129	66.4	75.5	58.5	17.0
9	.880	29.965	.790	.175	68.2	78.5	58.3	20.2
10	.765	.834	.703	.131	73.4	83.7	65.4	18.3
11	.785	.845	.743	.102	76.5	82.0	73.0	9.0
12	.844	.910	.783	.127	77.3	83.2	73.2	10.0
13	.915	.996	.868	.128	71.1	75.4	67.5	7.9
14	.924	30.016	.830	.186	71.2	77.7	67.0	10.7
15	30.058	.145	.986	.159	66.3	74.6	58.6	16.0
16	.103	.182	30.055	.127	66.7	77.0	57.0	20.0
17	.092	.174	.028	.146	68.8	79.7	58.5	21.2
18	29.988	.074	29.910	.164	71.1	83.2	61.3	21.9
19	.961	.037	.916	.121	74.6	84.4	67.3	17.1
20	.962	.052	.907	.145	75.5	84.7	69.2	15.5
21	.907	29.977	.847	.130	78.0	86.2	71.8	14.4
22	.886	.959	.837	.122	78.2	89.3	70.8	18.5
23	.938	30.029	.871	.158	76.5	83.5	70.5	13.0
24	.928	.003	.864	.139	75.0	82.5	70.3	12.2
25	.904	29.989	.849	.140	77.2	87.2	70.5	16.7
26	.926	30.019	.863	.156	77.4	86.6	69.2	17.4
27	.949	.015	.882	.133	77.4	84.7	72.5	12.2
28	.991	.079	.938	.141	75.9	85.7	69.0	16.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in $\frac{1}{100}$ Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	65.6	2.6	63.5	4.7	0.588	6.48	1.10	0.86
2	66.9	3.1	64.4	5.6	.605	.66	.31	.83
3	67.3	3.7	64.3	6.7	.603	.63	.62	.80
4	65.1	5.4	60.8	9.7	.537	5.90	2.23	.73
5	65.5	1.9	64.0	3.4	.597	6.61	0.78	.89
6	63.1	1.7	61.7	3.1	.554	.15	.63	.90
7	61.9	4.2	58.5	7.6	.498	5.51	1.59	.78
8	60.7	5.7	56.1	10.3	.459	.10	2.07	.71
9	62.8	5.4	58.5	9.7	.498	.49	.09	.72
10	70.5	2.9	68.2	5.2	.686	7.50	1.37	.85
11	73.7	2.8	71.7	4.8	.768	8.35	.40	.86
12	73.1	4.2	70.2	7.1	.732	7.94	2.04	.80
13	65.2	5.9	60.5	10.6	.522	5.84	.44	.71
14	66.6	4.6	62.9	8.3	.576	6.33	1.97	.76
15	57.3	9.0	50.1	16.2	.375	4.15	3.00	.58
16	58.9	7.8	52.7	14.0	.409	.54	2.69	.63
17	61.0	7.8	54.8	14.0	.440	.84	.87	.63
18	65.4	5.7	60.8	10.3	.537	5.90	.38	.71
19	69.9	4.7	66.6	8.0	.651	7.09	.11	.77
20	70.7	4.8	67.3	8.2	.666	.25	.21	.77
21	73.3	4.7	70.0	8.0	.727	.87	.32	.77
22	72.4	5.8	68.3	9.9	.688	.45	.80	.73
23	70.7	5.8	66.6	9.9	.651	.07	.68	.73
24	68.6	6.4	64.1	10.9	.599	6.52	.79	.74
25	69.4	7.8	63.9	13.3	.595	.46	3.49	.65
26	69.9	7.5	64.6	12.8	.609	.60	.41	.66
27	72.4	5.0	68.9	8.5	.701	7.60	2.41	.76
28	66.9	9.0	60.6	15.3	.534	5.80	3.77	.61

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.959	30.125	29.767	0.358	69.1	75.2	61.0	14.2
1	.947	.119	.759	.360	68.5	75.0	60.3	14.7
2	.934	.110	.754	.356	67.9	74.5	59.8	14.7
3	.924	.092	.744	.348	67.5	74.2	59.2	15.0
4	.914	.075	.718	.357	67.1	74.0	58.5	15.5
5	.925	.084	.742	.342	66.7	73.5	58.0	15.5
6	.913	.096	.755	.341	66.4	73.2	57.5	15.7
7	.966	.118	.771	.347	66.3	73.5	57.0	16.5
8	.993	.144	.793	.351	67.6	74.4	59.5	14.9
9	30.018	.168	.821	.347	70.4	76.9	63.0	13.9
10	.030	.182	.834	.348	72.9	80.0	64.5	15.5
11	.018	.168	.817	.351	75.3	83.0	65.0	18.0
Noon.	29.996	.161	.798	.363	77.2	85.0	67.0	18.0
1	.966	.115	.770	.345	78.5	86.6	68.5	18.1
2	.937	.093	.733	.360	79.2	87.6	68.0	19.6
3	.919	.071	.716	.355	79.7	89.0	68.8	20.2
4	.906	.059	.703	.356	79.6	89.3	69.0	20.3
5	.908	.055	.708	.347	78.3	86.5	67.5	19.0
6	.917	.068	.721	.347	75.9	83.0	65.5	17.5
7	.931	.078	.748	.330	73.9	80.0	64.5	15.5
8	.950	.099	.759	.340	72.5	79.5	64.3	15.2
9	.965	.119	.774	.345	71.4	78.6	64.3	14.3
10	.974	.135	.777	.358	70.5	78.0	63.2	14.8
11	.970	.135	.771	.364	69.8	75.5	62.2	13.3

Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
stations during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February, 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	66.5	2.6	66.4	4.7	0.605	6.67	1.11	.86
1	66.1	2.4	64.2	4.3	.601	.64	.01	.87
2	65.7	2.2	63.9	4.0	.595	.58	0.93	.88
3	65.3	2.2	63.5	4.0	.588	.50	.92	.88
4	65.1	2.0	63.5	3.6	.588	.50	.82	.89
5	64.8	1.9	63.3	3.4	.584	.47	.76	.90
6	64.5	1.9	63.0	3.4	.578	.41	.76	.89
7	64.4	1.9	62.9	3.4	.576	.39	.76	.89
8	65.0	2.6	62.9	4.7	.576	.37	1.07	.86
9	66.1	4.3	62.7	7.7	.572	.29	.81	.78
10	66.8	6.1	61.9	11.0	.557	.09	2.64	.70
11	67.3	8.0	61.7	13.6	.554	.02	3.38	.64
Noon.	68.0	9.2	61.6	15.6	.552	5.97	.98	.60
1	68.5	10.0	61.5	17.0	.550	.95	4.40	.58
2	68.6	10.6	61.2	18.0	.544	.89	.68	.56
3	69.0	10.7	61.5	18.2	.550	.94	.78	.55
4	69.0	10.6	61.6	18.0	.552	.95	.74	.56
5	68.7	9.6	62.0	16.3	.559	6.05	.23	.59
6	69.3	6.6	64.7	11.2	.611	.65	2.92	
7	68.6	5.3	64.9	9.0	.615	.73	.28	
8	68.1	4.4	64.6	7.9	.609	.67	1.96	
9	67.5	3.9	64.4	7.0	.605	.65	.70	
10	67.0	3.5	64.2	6.3	.601	.61	.52	
11	66.9	2.9	64.6	5.2	.609	.71	.24	

All the Hygrometrical elements are computed by the Greenwich

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches.		lb	Miles.	
1	124.0	0.80	E N E & Variable	1.0	208.9	O to 7 A. M., $\searrow$ i to 5 P. M. O to 11 P. M. T & L at 6½ A. M. R from 6 to 7 A. M.
2	132.0	0.15	E by N & W by S	...	154.2	O to 6 A. M., $\searrow$ i to 9 A. M., $\nearrow$ i & $\searrow$ i to 11 P. M. Slightly foggy from 7 to 9 & at 11 P. M. Slight R from midnight to 5 A. M.
3	109.8	...	W N W & E by N	...	93.6	B to 1 A. M., $\searrow$ i to 1 P. M., $\nearrow$ i to 4 P. M. B to 11 P. M. Foggy from midnight to 3 A. M.
4	133.4	...	E by N & E	...	126.3	B to 1 P. M., $\searrow$ i & $\nearrow$ i to 5 P. M. B to 7 P. M., $\searrow$ i to 11 P. M. D at 10½ P. M.
5	...	2.01	E & E by S	1.4	102.7	$\searrow$ i to 2 A. M. O to 11 P. M. T & L at 5, 6 A. M. 6 & 7 P. M. R nearly the whole day.
6	97.0	0.16	E & E by N	...	223.8	$\searrow$ i to 1 A. M. O to 4 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M. Slight R at 3, 5½ & 8 A. M.
7	136.0	...	E by N & N W	...	75.2	B to 1 A. M., $\searrow$ i & $\searrow$ i to 1 P. M. B to 11 P. M. Slightly foggy at midnight & 1 A. M. & from 7 to 10 P. M.
8	130.7	...	W & W by N	...	86.3	B Slightly foggy at 7 A. M. & from 9 to 11 P. M.
9	136.2	...	W N W & S S W	...	55.8	B.
10	138.8	...	S S W	...	99.4	B to 7 A. M. O to 10 A. M., $\nearrow$ i to 4 P. M. B to 11 P. M. Slightly foggy at 6 & 7 A. M.
11	132.8	...	S S W & S W	3.5	199.8	B to 2 A. M. O to 8 A. M., $\nearrow$ i to 7 P. M. B to 11 P. M.
12	131.0	...	S W & N by W	...	195.2	$\searrow$ i to 2 A. M. O to 7 A. M., $\nearrow$ i to 4 P. M. B to 11 P. M.
13	123.4	...	N E & E by N	...	128.4	B to 4 A. M., $\searrow$ i to 9 P. M. O to 11 P. M. L at 11¼ P. M. D at 11½ P. M.

$\searrow$ i Cirri, $\nearrow$ i Strati, $\nearrow$ i Cumuli, $\searrow$ i Cirro-strati, $\searrow$ i Cumulo-strati, $\searrow$ i Nimbi,
 $\searrow$ i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
14	129.5	0.63	SE & NW	3.0	158.4	☁ to 5 A. M. O to 9 A. M., ☁ to 4 P. M. B to 11 P. M. T & Hailstone at 1 A. M. L from midnight to 5 A. M. R from midnight to 1 A. M.
15	130.0	...	N & NE	0.5	198.9	B.
16	131.2	...	NE & NW	...	86.2	B.
17	128.5	...	NW, NNW & W	...	81.9	B. Slightly foggy from 8 to 10 P. M.
18	135.5	...	WSW, SW & SSW	...	81.1	B.
19	138.0	...	SSW & W by S	...	153.8	B.
20	135.5	...	SSW & SW	...	73.1	B to 3 A. M. O to 8 A. M. B to 11 P. M. Foggy from 1 to 5 A. M. O to 6 A. M. Scuds to 9 A. M. B to 12 A. M., ☁ & ☁ to 7 P. M. B to 11 P. M. Slightly foggy at midnight.
21	138.0	...	SW	3.0	130.3	B to 7 A. M. clouds of different kinds to 11 P. M. Foggy at 6 & 7 A. M.
22	142.0	...	SSW	...	156.2	☁ & ☁ to 12 A. M. O to 7 P. M. S to 11 P. M.
23	128.0	...	S, SW & N	0.4	128.5	O to 10 A. M., ☁ to 8 P. M. B to 11 P. M.
24	136.2	...	SSW & variable	...	85.0	B.
25	135.0	...	SW & W by S	...	116.0	B to 5 A. M., ☁ to 1 P. M.
26	134.0	0.02	Variable	...	80.7	☁ to 6 P. M. O to 9 P. M. ☁ to 11 P. M. Light R at 7½ & 8½ P. M.
27	132.0	...	WSW & W by N	...	76.0	B to 6 A. M. O to 8 A. M., ☁ to 6 P. M. B to 11 P. M.
28	136.0	...	WSW & W	...	59.8	B to 2 P. M., ☁ 4 P. M. B to 11 P. M. Foggy from 5 to 7 A. M.

☁ Cirri, —i Strati, ☁ Cumuli, ☁ Cirro-strati, ☁ Cumulo-strati, ☁ Nimbi, ☁ Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of February 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.955
Max. height of the Barometer occurred at 10 A. M. on the 16th ...	30.182
Min. height of the Barometer occurred at 4 P. M. on the 10th ...	29.703
Extreme range of the Barometer during the month	0.479
Mean of the daily Max. Pressures	30.035
Ditto ditto Min. ditto	29.892
Mean daily range of the Barometer during the month	0.143

	°
Mean Dry Bulb Thermometer for the month	72.2
Max. Temperature occurred at 4 P. M. on the 22nd	89.3
Min. Temperature occurred at 7 A. M. on the 16th	57.0
Extreme range of the Temperature during the month	32.3
Mean of the daily Max. Temperature	80.1
Ditto ditto Min. ditto,	65.9
Mean daily range of the Temperature during the month	14.2

Mean Wet Bulb Thermometer for the month	66.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.3
Computed Mean Dew-point for the month	62.7
Mean Dry Bulb Thermometer above computed mean Dew-point	9.5

	Inches.
Mean Elastic force of Vapour for the month	0.572

	Troy grain.
Mean Weight of Vapour for the month	6.26
Additional Weight of Vapour required for complete saturation ...	2.29
Mean degree of humidity for the month, complete saturation being unity	0.73

	°
Mean Max. Solar radiation Thermometer for the month	130.9

	Inches.
Rained 8 days,—Max. fall of rain during 24 hours	2.01
Total amount of rain during the month	3.77
Total amount of rain indicated by the Gauge ^a attached to the anemo- meter during the month	3.17
Prevailing direction of the Wind ... S. S. W., S. W. & E. by N.	

Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Feb. 1874.
MONTHLY RESULTS.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.985	30.058	29.911	0.147	74.5	85.7	64.0	21.7
2	.932	.024	.845	.179	75.8	86.2	66.2	20.0
3	.839	29.902	.776	.126	76.7	86.0	69.0	17.0
4	.854	.914	.804	.110	78.2	89.5	71.0	18.5
5	.915	30.004	.865	.139	76.7	85.7	72.0	13.7
6	.885	29.975	.828	.147	75.2	83.5	69.5	14.0
7	.843	.931	.761	.170	76.7	86.8	70.5	16.3
8	.834	.901	.779	.122	75.5	86.6	68.8	17.8
9	.803	.871	.734	.137	78.3	88.0	71.5	16.5
10	.849	.913	.794	.119	79.0	87.0	73.5	13.5
11	.968	30.052	.876	.176	76.3	83.5	71.0	12.5
12	.970	.071	.882	.189	74.0	86.4	63.7	22.7
13	.908	29.997	.832	.165	74.1	86.0	63.4	22.6
14	.835	.910	.766	.144	76.8	90.2	65.5	24.7
15	.829	.921	.766	.155	79.8	92.0	71.8	20.2
16	.883	.980	.813	.167	72.8	76.0	70.0	6.0
17	.823	.902	.736	.166	74.6	82.8	68.8	14.0
18	.736	.819	.677	.142	78.7	86.0	73.0	13.0
19	.761	.832	.707	.125	78.0	86.3	71.8	14.5
20	.754	.845	.682	.163	77.2	88.3	68.5	19.8
21	.835	.917	.733	.184	78.6	88.0	70.0	18.0
22	.850	.939	.762	.177	79.0	88.6	71.4	17.2
23	.714	.784	.635	.149	79.6	88.0	72.4	15.6
24	.654	.717	.580	.137	81.5	91.3	76.5	14.8
25	.708	.780	.634	.146	82.7	93.5	75.2	18.3
26	.801	.882	.711	.171	81.8	91.2	75.0	16.2
27	.868	.958	.807	.151	81.8	92.6	75.0	17.6
28	.847	.936	.764	.172	80.5	93.0	68.8	24.2
29	.811	.897	.726	.171	81.9	94.0	74.0	20.0
30	.793	.861	.737	.124	83.6	96.4	73.0	23.4
31	.772	.856	.689	.167	84.0	95.8	75.0	20.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	65.2	9.3	58.7	15.8	0.501	5.46	3.72	0.60
2	67.1	8.7	61.0	14.8	.541	.88	.66	.62
3	68.9	7.8	63.4	13.3	.586	6.36	.41	.65
4	71.4	6.8	66.6	11.6	.651	7.04	.21	.69
5	70.1	6.6	65.5	11.2	.628	6.83	2.97	.70
6	68.2	7.0	63.3	11.9	.584	.35	3.02	.68
7	66.5	10.2	59.4	17.3	.513	5.56	4.24	.57
8	69.7	5.8	65.6	9.9	.330	6.86	2.60	.73
9	74.2	4.1	71.3	7.0	.758	8.21	.07	.80
10	74.8	4.2	71.9	7.1	.773	.36	.14	.80
11	66.1	10.2	59.0	17.3	.506	5.50	4.19	.57
12	60.9	13.1	51.7	22.3	.396	4.32	.72	.48
13	62.6	11.5	54.5	19.6	.435	.74	.33	.52
14	66.1	10.7	58.6	18.2	.499	5.42	.41	.55
15	71.2	8.6	65.2	14.6	.621	6.70	.05	.62
16	70.0	2.8	67.8	5.0	.677	7.41	1.30	.85
17	69.2	5.4	65.4	9.2	.626	6.82	2.38	.74
18	72.1	6.6	67.5	11.2	.670	7.26	3.15	.70
19	67.6	10.4	60.3	17.7	.528	5.72	4.47	.56
20	68.1	9.1	61.7	15.5	.554	.99	3.96	.60
21	70.9	7.7	65.5	13.1	.628	6.80	.58	.66
22	72.2	6.8	67.4	11.6	.668	7.21	.29	.69
23	75.0	4.6	71.8	7.8	.771	8.31	2.38	.78
24	76.8	4.7	73.5	8.0	.814	.76	.55	.78
25	74.9	7.8	69.4	13.3	.713	7.66	4.06	.65
26	73.6	8.2	67.9	13.9	.679	.30	.10	.64
27	71.2	10.6	63.8	18.0	.593	6.37	5.03	.56
28	70.4	10.1	63.3	17.2	.584	.29	4.69	.57
29	72.1	9.8	65.2	16.7	.621	.68	.76	.58
30	71.7	11.9	63.4	20.2	.586	.27	5.76	.52
31	77.7	6.3	73.3	10.7	.809	8.65	3.52	.71

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.841	30.009	29.661	0.348	73.8	78.6	67.0	11.6
1	.830	.000	.651	.349	73.3	78.0	66.4	11.6
2	.817	29.994	.644	.350	72.9	77.5	65.9	11.6
3	.806	.980	.634	.346	72.5	77.3	65.2	12.1
4	.801	.976	.629	.347	72.0	77.2	64.6	12.6
5	.818	.984	.639	.345	71.6	77.0	64.1	12.9
6	.836	.998	.655	.343	71.1	76.5	63.4	13.1
7	.858	30.012	.686	.326	71.3	77.0	63.7	13.3
8	.888	.048	.704	.344	73.2	79.6	67.5	12.1
9	.907	.059	.715	.344	76.6	82.5	70.3	12.2
10	.912	.071	.717	.354	79.6	86.4	71.5	14.9
11	.903	.053	.714	.339	82.7	90.3	72.6	18.2
Noon.	.877	.027	.690	.337	84.8	93.0	72.0	21.0
1	.847	.001	.651	.350	86.4	94.3	72.9	21.4
2	.816	29.985	.629	.356	87.2	95.5	74.4	21.1
3	.790	.957	.597	.360	87.8	96.4	73.5	22.9
4	.779	.950	.591	.359	87.3	96.4	73.0	23.4
5	.774	.955	.580	.375	86.1	95.4	72.9	22.5
6	.781	.965	.589	.376	82.8	92.0	72.0	20.0
7	.797	.976	.625	.351	79.5	86.7	71.0	15.7
8	.816	30.000	.644	.356	77.7	84.0	70.8	13.2
9	.835	.014	.675	.339	76.3	82.0	70.9	11.1
10	.845	.019	.680	.339	75.5	80.5	70.0	10.5
11	.846	.013	.673	.340	74.8	79.6	68.5	11.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	70.2	3.6	67.7	6.1	0.674	7.37	1.61	0.82
1	69.9	3.4	67.2	6.1	.664	.26	.58	.82
2	69.6	3.3	67.0	5.9	.659	.21	.52	.83
3	69.3	3.2	66.7	5.8	.653	.14	.49	.83
4	69.2	2.8	67.0	5.0	.659	.23	.27	.85
5	68.8	2.8	66.6	5.0	.651	.14	.26	.85
6	68.6	2.5	66.6	4.5	.651	.14	.14	.86
7	68.6	2.7	66.4	4.9	.646	.10	.23	.85
8	69.4	3.8	66.4	6.8	.646	.07	.75	.80
9	70.4	6.2	66.1	10.5	.640	6.94	2.83	.71
10	70.8	8.8	64.6	15.0	.609	.58	4.11	.62
11	70.8	11.9	62.5	20.2	.568	.10	5.62	.52
Noon.	70.6	14.2	60.7	24.1	.536	5.71	6.75	.46
1	70.6	15.8	59.5	26.9	.515	.47	7.59	.42
2	70.9	16.3	61.1	26.1	.543	.77	.60	.43
3	70.8	17.0	60.6	27.2	.534	.66	.94	.42
4	70.5	16.8	60.4	26.9	.550	.63	.78	.42
5	71.1	15.0	60.6	25.5	.534	.57	.38	.43
6	71.7	11.1	63.9	18.9	.595	6.38	5.37	.54
7	71.1	8.4	65.2	14.3	.621	.72	3.94	.63
8	70.5	7.2	65.5	12.2	.628	.81	.29	.67
9	70.3	6.0	66.1	10.2	.640	.96	2.73	.72
10	70.6	4.9	67.2	8.3	.664	7.23	.23	.76
11	70.7	4.1	67.8	7.0	.677	.38	1.88	.80

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches	[S W	lb	Miles.	
1	134.5	...	W by S, W S W &	...	72.5	B to 12 A. M., \i to 11 P. M.
2	139.0	...	SW & WSW	...	73.2	B to 4 P. M., \i to 11 P. M.
3	134.0	...	S by W & S W	...	63.9	\i to 11 A. M. S to 3 P. M., \i to 11 P. M. Foggy at 3, 4 & 6 A. M.
4	145.9	...	S W & S S W	...	35.8	\i. Foggy from 4 to 8 A. M.
5	131.9	...	S by W & S W	...	40.1	\i to 4 A. M. O to 11 A. M., \i to 3 P. M. B to 7 P. M., \i to 9 P. M. B to 11 P. M. D at 10 A. M.
6	132.2	...	S W & W S W	8.0	60.4	B to 6 A. M., \i & \i to 3 P. M. O to 9 P. M. \i to 11 P. M. Brisk wind from 12 A. M. to 3½ P. M. D at 3½ & 9 P. M.
7	134.5	0.41	S by W & N N W	6.2	151.8	\i to 1 A. M. O to 9 A. M. \i to 12 A. M., \i & \i to 8 P. M. S to 11 P. M. Brisk wind from 6½ to 7½ A. M. & at 11 P. M. T at 11 P. M. L from 8 to 11 P. M. Slight R at 3, 6 & 7½ A. M. & between 10 & 11 P. M.
8	134.5	0.78	S	18.0	91.0	O to 4 A. M., \i to 8 A. M. B to 12 A. M., \i to 11 P. M. High wind from 5½ to 6½ P. M. T at 5½ & 6 P. M. L from 5½ to 11½ P. M. Hail stone at 6 P. M. R at 6 & 9½ P. M.
9	137.5	...	S W & W	0.9	129.2	Chiefly B.
10	140.0	0.09	W S W	...	93.0	\i to 1 A. M. S to 7 A. M., \i to 3 P. M. B to 5 P. M. S to 8 P. M. B to 11 P. M. T at 7 P. M. L from 6½ to 8 P. M. Slight R at 7½ P. M.
11	134.0	...	...	...	285.1	B. Foggy from 3 to 5 A. M.
12	134.2	...	N	...	168.6	B. Slightly foggy from 7 to 10 P. M.
13	140.0	...	WNW, NW & SW	...	124.2	B.
14	142.0	...	W S W & S W	...	82.8	B.
15	140.5	...	S W & S S E	...	111.7	B to 1 P. M. \i to 4 P. M. B to 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Mile.	
16	...	0.40	S S E & variable	...	129.2	B to 2 A. M. O to 11 P. M. T between 7 & 8, 10 & 11 A. M., & at 10 P. M. L at 7½ A. M. & between 10 & 11 P. M. Slight R after intervals.
17	135.0	0.10	Variable.	1.0	146.5	O to 11 A. M., ~i to 4 P. M., ~i to 8 P. M., ~i to 11 P. M. T at 4½ P. M., L at 7, 8 & 10 P. M. Slight R at 1, 3½ A. M. 3 & 7½ P. M.
18	139.0	...	SSW, WSW & S	...	152.1	~i to 7 A. M. B to 10 A. M. ~i to 8 P. M. B to 11 P. M. L at midnight & from 7 to 9 P. M.
19	139.0	...	S & N W	...	77.8	B to 5 P. M. ~i & ~i to 11 P. M.
20	140.0	...	E by N & S W	...	61.6	~i to 4 A. M. O to 8 A. M., ~i to 6 P. M., ~i to 9 P. M. B to 11 P. M. L from 6½ to 9 P. M. D at 8 P. M.
21	143.5	...	E & E N E	...	112.6	B to 2 A. M. ~i to 6 A. M. B to 9 A. M., ~i to 7 P. M. B to 11 P. M.
22	145.0	...	S E & S W	...	57.2	B to 7 A. M., ~i to 4 P. M., ~i to 7 P. M. B to 11 P. M.
23	142.2	...	S & S S W	1.7	186.3	B to 6 A. M., seeds to 9 A. M., ~i to 6 P. M. B to 11 P. M. Brisk wind nearly the whole day.
24	140.0	0.16	S by W & S S W	7.5	316.4	B to 3 A. M., ~i to 10 A. M., ~i to 6 P. M. B to 8 P. M., seeds to 11 P. M. Strong wind from 9 A. M. to 5½ P. M. T, L & hail-stone between 3 & 4 P. M. R at 9½ A. M. & 3½ P. M.
25	148.3	...	S S W & S by W	0.2	268.3	B.
26	140.2	...	S W & N by W	...	138.7	B to 2 A. M. S to 8 A. M. B to 11 P. M.
27	145.0	...	W S W & N W	...	90.1	B to 2 A. M. S to 6 A. M. B to 11 P. M.
28	141.5	...	S W, & S S W	...	113.3	B. Slightly foggy at 6 & 7 A. M.
29	144.0	...	S S W, S W & W	...	152.3	Chiefly B. Slightly foggy at 4 & 5 A. M.
30	146.0	...	S W & W	0.3	129.5	B.
31	145.5	...	S by W & S	...	141.0	B. Slightly foggy at 5 A. M.

~i Cirri,—i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of March 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ...	29.834
Max. height of the Barometer occurred at 10 A. M. on the 12th ...	30.071
Min. height of the Barometer occurred at 5 P. M. on the 24th ...	29.580
Extreme range of the Barometer during the month ...	0.491
Mean of the daily Max. Pressures ...	29.914
Ditto ditto Min. ditto ...	29.762
Mean daily range of the Barometer during the month ...	0.152

	°
Mean Dry Bulb Thermometer for the month ...	78.2
Max. Temperature occurred at 3 & 4 P. M. on the 30th ...	96.4
Min. Temperature occurred at 6 A. M. on the 13th ...	63.4
Extreme range of the Temperature during the month ...	33.0
Mean of the daily Max. Temperature ...	88.2
Ditto ditto Min. ditto ...	70.6
Mean daily range of the Temperature during the month ...	17.6

Mean Wet Bulb Thermometer for the month ...	70.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	8.0
Computed Mean Dew-point for the month ...	64.6
Mean Dry Bulb Thermometer above computed mean Dew-point ...	13.6

	Inches.
Mean Elastic force of Vapour for the month ...	0.609

	Troy grain.
Mean Weight of Vapour for the month ...	6.59
Additional Weight of Vapour required for complete saturation ...	3.66
Mean degree of humidity for the month, complete saturation being unity ...	0.64

	°
Mean Max. Solar radiation Thermometer for the month ...	139.6

	Inches.
Rained 9 days.—Max. fall of rain during 24 hours ...	0.78
Total amount of rain during the month ...	1.94
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ...	1.52
Prevailing direction of the Wind ... S. W., S. S. W. & W. S. W.	

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.721	29.785	29.648	0.137	84.5	94.2	78.5	15.7
2	.751	.821	.690	.131	84.3	94.0	78.5	15.5
3	.810	.884	.759	.125	82.6	89.4	77.8	11.6
4	.801	.873	.721	.152	84.6	92.8	80.0	12.8
5	.782	.855	.709	.146	83.8	93.5	75.8	17.7
6	.830	.900	.765	.135	82.8	90.7	75.6	15.1
7	.865	.940	.809	.131	82.5	91.0	76.5	14.5
8	.822	.902	.739	.163	82.4	90.0	77.0	13.0
9	.766	.822	.692	.130	83.7	93.2	75.7	17.5
10	.805	.873	.740	.133	84.7	93.7	77.4	16.3
11	.818	.900	.731	.169	86.7	99.8	78.6	21.2
12	.791	.890	.683	.207	88.3	103.5	79.4	24.1
13	.757	.835	.674	.161	86.8	98.6	79.5	19.1
14	.738	.810	.655	.155	87.4	98.2	80.0	18.2
15	.797	.860	.739	.121	86.2	95.0	80.0	15.0
16	.831	.912	.751	.161	85.6	94.3	79.5	14.8
17	.777	.856	.687	.169	86.7	98.5	78.7	19.8
18	.723	.795	.638	.157	87.1	99.2	78.5	20.7
19	.690	.740	.634	.106	86.4	95.6	80.8	14.8
20	.718	.783	.658	.125	86.2	94.5	80.5	14.0
21	.766	.832	.690	.142	85.8	93.7	80.0	13.7
22	.700	.773	.609	.164	87.3	96.4	80.5	15.9
23	.667	.721	.615	.106	87.5	99.7	79.6	20.1
24	.745	.820	.665	.155	84.8	92.5	79.0	13.5
25	.777	.857	.711	.146	87.5	98.8	80.4	18.4
26	.766	.843	.684	.159	85.3	94.3	78.5	15.8
27	.771	.838	.660	.178	84.3	92.5	71.0	21.5
28	.805	.908	.722	.186	80.8	91.9	70.5	21.4
29	.725	.815	.649	.166	84.3	94.0	74.8	19.2
30	.724	.804	.627	.177	82.8	95.0	73.2	21.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	78.6	5.9	74.5	10.0	0.840	9.00	3.35	0.73
2	78.7	5.6	74.8	9.5	.849	.07	.21	.74
3	77.8	4.8	74.4	8.2	.838	.00	2.68	.77
4	78.7	5.9	74.6	10.0	.843	.02	3.37	.73
5	74.3	9.5	67.6	16.2	.672	7.20	4.90	.60
6	76.7	6.1	72.4	10.4	.785	8.43	3.32	.72
7	76.7	5.8	72.6	9.9	.790	.49	.15	.73
8	76.7	5.7	72.7	9.7	.792	.51	.10	.73
9	78.3	5.4	74.5	9.2	.840	9.01	.06	.75
10	79.7	5.0	76.2	8.5	.887	.49	2.93	.76
11	80.2	6.5	76.3	10.4	.890	.50	3.68	.72
12	79.6	8.7	74.4	13.9	.838	8.89	4.91	.64
13	80.6	6.2	76.9	9.9	.908	9.66	3.55	.73
14	80.3	7.1	76.0	11.4	.882	.39	4.06	.70
15	79.7	6.5	75.1	11.1	.857	.13	3.86	.70
16	78.8	6.8	74.0	11.6	.827	8.82	.94	.69
17	79.4	7.3	75.0	11.7	.854	9.09	4.09	.69
18	80.0	7.1	75.7	11.4	.873	.30	.03	.70
19	80.2	6.2	75.9	10.5	.879	.36	3.70	.72
20	80.5	5.7	76.5	9.7	.896	.56	.43	.74
21	80.4	5.4	76.6	9.2	.899	.59	.24	.75
22	81.3	6.0	77.7	9.6	.931	.90	.51	.74
23	81.5	6.0	77.9	9.6	.937	.96	.53	.74
24	79.4	5.4	75.6	9.2	.871	.31	.15	.75
25	79.2	8.3	74.2	13.3	.832	8.85	4.64	.66
26	79.4	5.9	75.3	10.0	.862	9.21	3.43	.73
27	78.1	6.2	73.8	10.5	.822	8.78	.50	.72
28	73.7	7.1	68.7	12.1	.697	7.51	.56	.68
29	75.7	8.6	69.7	14.6	.720	.69	4.59	.63
30	75.1	7.7	69.7	13.1	.720	.72	.03	.66

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.771	29.867	29.666	0.201	80.7	84.5	72.0	12.5
1	.761	.855	.653	.202	80.2	82.8	72.0	10.8
2	.748	.850	.638	.212	79.8	82.5	72.8	9.7
3	.740	.846	.631	.215	79.4	82.5	73.3	9.2
4	.744	.908	.639	.269	78.9	81.8	71.5	10.3
5	.759	.896	.615	.251	78.4	80.8	70.5	10.3
6	.779	.888	.660	.228	78.4	81.0	70.5	10.5
7	.801	.899	.695	.204	79.3	82.0	71.5	10.5
8	.824	.927	.711	.216	81.7	81.5	76.3	8.2
9	.837	.940	.721	.219	84.9	87.8	81.0	6.8
10	.838	.938	.714	.224	87.8	91.0	84.2	7.7
11	.827	.921	.709	.212	90.7	95.2	86.8	8.4
Noon.	.808	.907	.698	.209	92.6	97.7	87.8	9.9
1	.779	.881	.680	.201	93.8	99.8	88.5	11.3
2	.751	.856	.663	.193	94.4	101.5	89.4	12.1
3	.723	.829	.635	.194	94.6	103.0	88.8	14.2
4	.705	.815	.621	.194	93.9	103.5	88.0	15.5
5	.696	.809	.609	.200	91.7	99.4	85.0	14.4
6	.706	.814	.618	.196	88.7	95.4	83.5	11.9
7	.728	.824	.634	.190	85.8	89.5	82.0	7.5
8	.751	.846	.655	.191	83.5	87.0	73.5	13.5
9	.778	.855	.673	.182	82.1	84.7	73.0	11.7
10	.791	.886	.677	.209	81.1	84.0	71.0	13.0
11	.784	.876	.674	.202	80.7	83.5	72.0	11.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	77.3	3.4	74.9	5.8	0.853	9.17	1.87	0.83
1	77.3	2.9	75.3	4.9	.862	.31	.57	.86
2	77.1	2.7	75.2	4.6	.860	.28	.47	.86
3	76.9	2.5	75.1	4.3	.857	.27	.35	.87
4	76.7	2.2	75.2	3.7	.860	.30	.17	.89
5	76.5	1.9	75.2	3.2	.860	.31	.00	.90
6	76.5	1.9	75.2	3.2	.860	.31	.00	.90
7	77.1	2.2	75.6	3.7	.871	.40	.19	.89
8	78.0	3.7	75.4	6.3	.865	.32	2.05	.82
9	79.3	5.6	75.4	9.5	.865	.24	3.25	.74
10	80.0	7.8	75.3	12.5	.862	.16	4.44	.67
11	80.7	10.0	74.7	16.0	.846	8.93	5.87	.60
Noon.	80.8	11.8	73.7	18.9	.819	.62	7.01	.55
1	80.7	13.1	72.8	21.0	.795	.34	.84	.52
2	80.7	13.7	72.5	21.9	.787	.25	8.21	.50
3	80.7	13.9	72.4	22.2	.785	.22	.33	.50
4	80.6	13.3	72.6	21.3	.790	.30	7.92	.51
5	80.6	11.1	73.9	17.8	.821	.69	6.54	.57
6	79.9	8.8	74.6	14.1	.843	.94	5.02	.64
7	79.2	6.6	74.6	11.2	.845	9.00	3.83	.70
8	78.4	5.1	74.8	8.7	.849	.09	2.91	.76
9	78.0	4.1	75.1	7.0	.857	.21	.30	.80
10	77.4	3.7	74.8	6.3	.849	.15	.02	.82
11	77.1	3.6	74.6	6.1	.843	.09	1.95	.82

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1 st ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
1	147.0	...	S W & S	0.9	208.9	B to 2 A. M. S to 6 A. M. V to 3 P. M.
2	141.5	...	S S W & S W	0.3	189.2	B to 7 P. M. Seeds to 11 P. M.
3	136.5	...	S & S S W	2.0	169.7	Seeds to 2 A. M. B to 7 A. M., i to 12 A. M. B to 3 P. M., i to 5 P. M. B to 11 P. M.
4	144.0	...	S & S S W	1.0	258.5	Seeds to 9 A. M., i to 8 P. M. B to 11 P. M. Brisk wind from 10 A. M. to 11 P. M. T at 5 P. M. L at 7 P. M. D at 5½ P. M.
5	145.0	...	S S W & S W	...	176.3	Seeds to 9 A. M., i to 2 P. M. B to 8 P. M. Seeds to 11 P. M.
6	140.7	...	S by W & S	0.2	112.3	Seeds to 2 A. M. B to 11 P. M.
7	140.2	...	S S E & S by W	0.9	142.3	B to 6 A. M., i to 1 P. M., i to 3 P. M. B to 9 P. M. S to 11 P. M.
8	142.2	...	S by W & S	0.3	211.9	B to 2 A. M. Seeds to 6 A. M. i to 3 P. M. B to 11 P. M.
9	147.0	...	S & S by E	...	177.2	B to 3 A. M. O to 6 A. M., i to 12 A. M. B to 11 P. M.
10	146.0	...	S by E & S	0.8	182.7	Chiefly B.
11	148.0	...	S W & S S W	...	225.1	Chiefly B.
12	154.7	...	S S W & W S W	...	165.8	B to 2 A. M., seeds to 8 A. M.
13	144.6	...	S S E	0.2	126.2	B to 8 P. M., i to 11 P. M.
14	143.0	...	S by E & S S E	1.9	165.5	B to 2 A. M., Seeds to 7 A. M. B to 11 P. M.
15	144.5	...	S	0.4	193.5	B to 3 A. M., Seeds to 6 A. M.
16	145.0	...	S S W	1.7	275.5	S to 9 A. M. B to 9 P. M. S to 11 P. M.
17	145.9	...	S S W & S W	0.5	277.6	S to 3 A. M. B to 2 P. M., i & i to 4 P. M. B to 9 P. M., Seeds, to 11 P. M.
18	150.0	...	S S W & S by W	1.0	258.4	Clouds of Different kinds to 1 P. M. B to 11 P. M.
19	145.0	...	S by W & S	0.8	242.4	B. Brisk wind from 8½ A. M. to 5½ P. M.

i Cirri, — i Strati, i Cumuli, i Cirro-strati, i Cumulo-strati, i Nimbi,
i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb.	Mile.	
20	144.0	...	S S W & S	0.5	268.2	B to 3 A. M., Scuds to 6 A. M., ~i & ~i to 11 P. M.
21	143.0	...	S S W & S	0.6	272.8	O to 3 A. M. B to 3 P. M. O to 7 P. M., ~i to 9 P. M., Scuds to 11 P. M. L on W at 8 P. M.
22	148.0	...	S & S S W	0.3	260.5	B to 4 A. M., scuds to 9 A. M. B to 11 A. M., ~i to 2 P. M. B to 4 P. M., ~i to 11 P. M.
23	146.0	...	S & S by E	0.8	233.5	Scuds to 1 A. M. B to 5 A. M. S to 8 A. M. B to 2 P. M., ~i to 7 P. M. B to 11 P. M.
24	145.0	0.20	S, S by W & S by E	0.3	207.3	Scuds to 1 A. M. B to 4 A. M., ~i to 12 A. M. O to 7 P. M., ~i to 11 P. M. T at 1½, 3 & 7 P. M. L on W at 7 P. M. Light R at 1, 3 & 6½ P. M.
25	149.5	...	S & S S W	0.4	146.1	S to 5 A. M., ~i to 10 A. M., ~i to 7 P. M., ~i to 11 P. M.
26	146.0	...	S S E & S	0.9	206.6	Chiefly ~i.
27	144.5	0.25	S S E & S S W	9.2	265.5	~i to 7 A. M., ~i to 11 P. M. High wind between 8 & 9 P. M. T at 9 P. M. L at 9 & 11 P. M. R between 8 & 9 P. M.
28	145.0	0.21	S & Variable	8.5	222.6	Clouds of different kinds to 4 A. M., ~i to 7 A. M. B to 9 A. M., ~i to 6 P. M. O to 11 P. M. High wind from 3½ to 4½ A. M., & 9½ to 11 P. M. L & Slight R between 3 & 4 A. M. & from 9½ to 11 P. M.
29	145.0	...	S & N N W	3.0	198.0	O to 5 A. M., ~i to 2 P. M. B to 5 P. M. O to 11 P. M. High wind from Midnight to 1 A. M. & at 9½ P. M. T & L between 6 & 7 P. M.
30	142.0	0.81	S W & Variable	7.2	134.2	~i to 1 A. M. B to 4 A. M., ~i to 7 A. M. Scuds to 10 A. M. ~i to 7 P. M. O to 11 P. M. High wind at 7½ P. M. T & L from 6½ to 11 P. M. R from 7½ to 10 P. M.

~i Cirri,—i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of April 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ...	29.708
Max. height of the Barometer occurred at 9 A. M. on the 7th ...	29.940
Min. height of the Barometer occurred at 5 P. M. on the 22nd ...	29.609
Extreme range of the Barometer during the month ...	0.331
Mean of the daily Max. Pressures ...	29.842
Ditto ditto Min. ditto ...	29.692
Mean daily range of the Barometer during the month ...	0.150

	°
Mean Dry Bulb Thermometer for the month ...	85.1
Max. Temperature occurred at 4 P. M. on the 12th ...	103.5
Min. Temperature occurred at 5 & 6 A. M. on the 28th ...	79.5
Extreme range of the Temperature during the month ...	33.0
Mean of the daily Max. Temperature ...	95.0
Ditto ditto Min. ditto, ...	77.9
Mean daily range of the Temperature during the month ...	17.1

Mean Wet Bulb Thermometer for the month ...	78.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.5
Computed Mean Dew-point for the month ...	74.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	11.1

	Inches.
Mean Elastic force of Vapour for the month ...	0.827

	Troy grain.
Mean Weight of Vapour for the month ...	8.84
Additional Weight of Vapour required for complete saturation ...	3.73
Mean degree of humidity for the month, complete saturation being unity ...	0.70

	°
Mean Max. Solar radiation Thermometer for the month ...	145.0

	Inches.
Rained 5 days,—Max. fall of rain during 24 hours ...	0.81
Total amount of rain during the month ...	1.20
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month ...	0.99
Prevailing direction of the Wind ...	S. & S. S. W.

* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.717	29.787	29.630	0.157	82.9	94.5	72.9	21.6
2	.688	.755	.609	.146	86.9	97.5	79.0	18.5
3	.664	.739	.596	.143	87.3	98.5	80.4	18.1
4	.638	.684	.587	.097	86.0	93.5	80.0	13.5
5	.675	.728	.617	.111	86.9	95.5	80.9	14.6
6	.690	.745	.649	.096	87.0	94.5	80.6	13.9
7	.680	.749	.624	.125	87.8	96.9	81.2	15.7
8	.623	.695	.545	.150	88.4	96.0	82.8	13.2
9	.605	.661	.550	.111	87.2	95.6	81.3	14.3
10	.597	.689	.513	.176	86.6	93.6	81.6	12.0
11	.538	.577	.457	.120	88.4	98.8	82.2	16.6
12	.580	.700	.510	.190	86.6	93.5	76.5	17.0
13	.664	.732	.577	.155	83.4	91.5	76.0	15.5
14	.684	.752	.628	.124	86.6	94.5	81.3	13.2
15	.619	.694	.518	.176	87.8	96.5	82.4	14.1
16	.528	.593	.450	.143	89.1	98.5	82.3	16.2
17	.549	.598	.496	.102	89.3	98.6	83.5	15.1
18	.580	.646	.513	.133	89.6	99.8	83.5	16.3
19	.547	.605	.459	.146	90.2	101.5	83.6	17.9
20	.518	.573	.452	.121	89.2	98.7	84.0	14.7
21	.515	.567	.456	.111	90.0	100.3	83.5	16.8
22	.539	.587	.480	.107	89.6	98.0	83.8	14.2
23	.590	.646	.522	.124	88.2	96.0	82.0	14.0
24	.612	.679	.528	.151	87.4	93.8	81.5	12.3
25	.621	.683	.522	.161	86.2	94.5	78.9	15.6
26	.616	.660	.519	.141	83.7	91.3	76.0	15.3
27	.608	.674	.537	.137	86.6	94.5	81.0	13.5
28	.624	.690	.556	.134	84.2	90.9	80.2	10.7
29	.564	.608	.457	.151	85.5	95.5	77.8	17.7
30	.589	.650	.524	.126	84.0	96.5	78.0	18.5
31	.672	.724	.616	.108	86.3	95.6	78.0	17.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	76.7	6.2	72.4	10.5	0.785	8.41	3.38	0.71
2	80.6	6.3	76.8	10.1	.905	9.63	.62	.73
3	80.6	6.7	76.6	10.7	.899	.56	.85	.71
4	78.8	7.2	73.8	12.2	.822	8.76	4.15	.68
5	80.2	6.7	76.2	10.7	.887	9.45	3.80	.71
6	80.0	7.0	75.8	11.2	.876	.33	.96	.70
7	80.3	7.5	75.8	12.0	.876	.31	4.29	.69
8	80.8	7.6	76.2	12.2	.887	.43	.41	.68
9	80.2	7.0	76.0	11.2	.882	.39	3.98	.70
10	80.4	6.2	76.7	9.9	.902	.60	.54	.73
11	81.1	7.3	76.7	11.7	.902	.56	4.28	.69
12	81.4	5.2	78.3	8.3	.949	10.12	3.02	.77
13	78.5	4.9	75.1	8.3	.857	9.19	2.77	.77
14	80.9	5.7	77.5	9.1	.925	.86	3.28	.75
15	81.6	6.2	77.9	9.9	.937	.96	.64	.73
16	82.2	6.9	78.1	11.0	.943	10.00	4.12	.71
17	83.1	6.2	79.4	9.9	.983	.41	3.80	.73
18	83.1	6.5	79.2	10.4	.976	.35	.98	.72
19	82.8	7.4	78.4	11.8	.952	.06	4.53	.69
20	83.1	6.1	79.4	9.8	.983	.41	3.75	.74
21	83.0	7.0	78.8	11.2	.964	.21	4.29	.70
22	81.7	7.9	77.0	12.6	.910	9.63	.70	.67
23	81.3	6.9	77.2	11.0	.916	.73	.03	.71
24	81.2	6.2	77.5	9.9	.925	.84	3.61	.73
25	79.7	6.5	75.1	11.1	.857	.13	.86	.70
26	79.0	4.7	75.7	8.0	.873	.36	2.71	.78
27	80.8	5.8	77.3	9.3	.919	.80	3.34	.75
28	80.1	4.1	77.2	7.0	.916	.81	2.43	.80
29	79.1	6.4	74.6	10.9	.843	.60	3.72	.71
30	77.9	6.1	73.6	10.4	.817	8.75	.42	.72
31	79.2	7.1	74.2	12.1	.832	.87	4.15	.68

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.619	29.752	29.513	0.239	82.4	86.0	73.8	12.2
1	.613	.737	.515	.222	82.2	85.8	72.9	12.9
2	.604	.725	.510	.215	81.9	85.5	72.9	12.6
3	.594	.715	.504	.211	81.6	85.0	73.5	11.5
4	.593	.704	.496	.208	81.3	84.4	73.5	10.9
5	.605	.720	.508	.212	81.2	84.5	74.0	10.5
6	.622	.743	.520	.223	81.3	84.5	74.8	9.7
7	.641	.754	.538	.216	82.6	86.0	75.0	11.0
8	.657	.778	.554	.224	85.2	88.0	79.7	8.3
9	.664	.780	.564	.216	88.0	91.0	82.8	8.2
10	.664	.787	.567	.220	90.4	94.0	85.6	8.4
11	.654	.774	.556	.218	92.6	96.5	89.5	7.0
Noon.	.639	.751	.534	.217	94.1	99.2	88.2	11.0
1	.619	.731	.515	.216	95.1	100.8	89.8	11.0
2	.595	.696	.489	.207	95.6	101.5	90.5	11.0
3	.572	.675	.455	.220	95.2	101.0	84.5	16.5
4	.552	.664	.452	.212	94.4	99.0	84.5	14.5
5	.546	.654	.450	.204	91.9	96.0	82.5	13.5
6	.559	.660	.461	.199	89.2	92.5	79.0	13.5
7	.577	.670	.473	.197	86.9	90.0	78.3	11.7
8	.603	.698	.487	.211	85.5	88.0	78.2	9.8
9	.618	.718	.508	.210	84.1	87.8	77.0	10.8
10	.627	.728	.528	.200	83.4	87.0	76.5	10.5
11	.623	.711	.531	.180	83.1	86.0	77.0	9.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.2	3.2	77.0	5.4	.910	9.79	1.82	.84
1	79.2	3.0	77.1	5.1	.913	.82	.72	.85
2	78.9	3.0	76.8	5.1	.905	.73	.71	.85
3	78.8	2.8	76.8	4.8	.905	.73	.61	.86
4	78.7	2.6	76.9	4.4	.908	.78	.46	.87
5	78.6	2.6	76.8	4.4	.905	.75	.46	.87
6	78.8	2.5	77.0	4.3	.910	.81	.43	.87
7	79.6	3.0	77.5	5.1	.925	.94	.74	.85
8	80.7	4.5	77.5	7.7	.925	.88	2.73	.78
9	81.5	6.5	77.6	10.4	.928	.87	3.81	.72
10	82.1	8.3	77.1	13.3	.913	.66	5.01	.66
11	82.8	9.8	76.9	15.7	.908	.54	6.09	.61
Noon.	83.1	11.0	76.5	17.6	.896	.40	.92	.58
1	83.3	11.8	76.2	18.9	.887	.29	7.50	.55
2	82.9	12.7	75.3	20.3	.862	.02	8.01	.53
3	82.7	12.5	75.2	20.0	.860	.00	7.84	.53
4	82.2	12.2	74.9	19.5	.851	8.91	.55	.54
5	81.7	10.2	75.6	16.3	.871	9.18	6.14	.60
6	81.1	8.1	76.2	13.0	.887	.41	4.75	.67
7	80.5	6.4	76.7	10.2	.902	.60	3.65	.73
8	80.2	5.3	76.5	9.0	.896	.57	.15	.78
9	79.7	4.4	76.6	7.5	.899	.61	2.60	.79
10	79.4	4.0	76.6	6.8	.899	.63	.33	.81
11	79.5	3.6	77.0	6.1	.910	.77	.09	.82

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
1	146.3	...	S W & S	0.5	183.5	↘i to 7 A. M. B to 6 P. M. S to 11 P. M. Sheet L on Wat 7 P. M.
2	146.2	...	S S W & S	...	261.6	↘i to 2 A. M. B to 5 A. M. ↘i to 8 A. M. B to 11 P. M.
3	140.0	...	S S W & S by W	0.2	72.1	B.
4	144.4	...	S S W & S	1.0	24.7	B to 4 A. M., ↘i to 11 P. M.
5	147.0	...	S & S S W	0.8	224.4	↘i to 7 A. M., ↗i to 10 A. M., ↘i to 1 P. M. B to 3 P. M., ↘i to 6 P. M. B to 11 P. M.
6	144.2	...	S by W & S	1.0	209.5	Clouds of different kinds to 9 A. M., ↘i to 2 P. M. B to 11 P. M.
7	146.0	...	S by W & S W	0.7	263.2	Seuds to 4 A. M. B to 11 P. M.
8	145.2	...	S S W & S W	3.0	367.5	B to 4 P. M., ↘i to 7 P. M. B to 11 P. M. Brisk wind nearly the whole day.
9	144.0	0.08	S W	5.8	399.7	B to 4 A. M., ↘i to 7 A. M. B to 4 P. M., ↘i to 7 P. M. B to 11 P. M. Brisk wind the whole day. T & light R at 5½ A. M.
10	146.7	...	S W & S S W	6.0	438.7	B to 5 A. M., ↗i to 10 A. M., ↘i to 5 P. M. B to 11 P. M. Brisk wind the whole day L on N from 8 to 10 P. M.
11	147.0	0.04	S W & S S W	4.4	467.7	B to 4 A. M., ↘i to 11 A. M., clouds of different kinds to 11 P. M. Brisk wind from 3½ to 9½ P. M. L on S from 7 to 10 P. M. T & light R at 6 P. M.
12	139.0	0.08	S W	5.0	313.7	S to 4 A. M. Seuds to 3 P. M. S to 7 P. M. O to 11 P. M. Brisk wind nearly the whole day. L from 8 to 11 P. M. Light R from 8½ to 9½ P. M.
13	139.7	...	E by S, S & S by W	1.2	287.7	O to 4 A. M. S to 11 P. M. L from Midnight to 4 A. M. D at 5½ P. M.

↘i Cirri, —i Strati, ↗i Cumuli, ↘i Cirro-strati, ~i Cumulo-strati, ~i Nimbi, ↘i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Mile.	
14	139.8	...	S by W & S S W	1.4	201.1	S to 3 A. M. Scuds to 6 A. M., ~i to 12 A. M., ~i to 8 P. M. S to 11 P. M. D at 3½ A. M.
15	143.0	...	S S W & S W	2.8	294.2	S to 3 A. M., ~i to 8 A. M. B to 4 P. M., ~i to 11 P. M. Brisk wind from 3 to 10½ P. M.
16	146.4	...	W S W & S by W	1.9	308.5	B to 4 A. M., ~i to 7 P. M. B to 9 P. M. Scuds to 11 P. M. Brisk wind from 5 to 7½ P. M.
17	143.7	...	S S W & S	1.2	317.5	Scuds to 1 A. M. B to 5 A. M. Scuds to 10 A. M., ~i to 1 P. M. B to 7 P. M., ~i to 11 P. M.
18	147.0	...	S S W & S	2.3	262.2	B to 7 A. M., Scuds to 10 A. M., ~i to 5 P. M. B to 11 P. M. Brisk wind from 5½ to 8¾ P. M.
19	149.0	...	S by W & S	1.5	273.9	Scuds to 7 A. M. B to 2 P. M., ~i to 4 P. M. B. to 11 P. M. Brisk wind from 4 to 6 P. M.
20	145.0	...	S by W & S by E	1.4	290.9	B to 4 A. M., Scuds to 8 A. M. B to 12 A. M., clouds of different kinds to 11 P. M. Brisk wind from 8½ A. M. to 5¾ P. M.
21	148.5	...	S & S S W	0.8	260.4	~i to 6 A. M. Scuds to 9 A. M. B to 11 P. M.
22	142.5	...	S & S by E	1.4	158.3	Scuds to 3 A. M. B to 6 A. M. Scuds to 9 A. M., ~i to 6 P. M. O to 11 P. M. Brisk wind from 12¾ A. M. to 5 P. M.
23	143.0	...	S & S S W	1.9	338.7	B to 4 A. M., Scuds to 11 A. M., ~i to 4 P. M. O to 11 P. M. Brisk wind from 12 A. M. to 4½ P. M. Sheet L on W at 10 P. M. D at 6 P. M.
24	136.9	...	S & S S W	2.0	239.3	S to 1 A. M., ~i & ~i to 6 P. M. S to 11 P. M. Brisk wind from 10 A. M. to 7½ P. M. Sheet L at 2 A. M. & between 7 & 8 P. M. D at 2¾ P. M.

~i Cirri,—i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
25	142.3	0.01	S S E & S S W	7.6	312.8	O to 5 A. M., $\sim$ i to 11 A. M., $\sim$ i to 6 P. M. S to 11 P. M. High wind from 8½ A. M. to 9½ P. M. T from 8½ to 10 P. M. L from 7½ to 11 P. M. Light R between 9 & 10 P. M.
26	138.0	0.85	S S W & S	5.2	302.2	O to 11 A. M., $\sim$ i to 6 P. M. O to 11 P. M. Brisk wind from 11½ A. M. to 6 & at 8½ P. M. T & L from Midnight to 4 A. M. & 7 to 10 P. M. R from 1 to 5 A. M. & 8½ to 11 P. M.
27	146.2	...	S & S S W	...	291.4	O to 9 A. M., $\sim$ i to 3 P. M. B to 5 P. M. S to 11 P. M. D at 8½ P. M.
28	143.0	...	S S W & Variable	2.9	181.1	$\sim$ i & $\sim$ i to 6 A. M. O to 10 A. M. $\sim$ i to 3 P. M., $\sim$ i to 8 P. M. B to 11 P. M. Brisk wind from 2 to 2½ P. M. T at 2 P. M. D at 7½, 8 9½ A. M. & 3 P. M.
29	146.5	...	S E & S by E	...	120.0	$\sim$ i to 8 A. M., $\sim$ i to 7 P. M. B to 11 P. M. T & D between 6 & 7 P. M.
30	144.0	0.07	W by N & S S E	4.0	110.0	O to 4 A. M., $\sim$ i to 9 A. M. B to 11 A. M., $\sim$ i to 4 P. M. O to 7 P. M. B to 11 P. M. Brisk wind from 4½ to 5 P. M. T at 1 A. M. & from 3 to 6½ P. M. L at 1 & 4 A. M. Light R at 3 A. M. 3, 5, 5½ & 6½ P. M.
31	147.5	...	S S E & S by E	...	143.2	B to 7 A. M., $\sim$ i to 6 P. M. B to 11 P. M.

$\sim$ i Cirri — i Strati, $\sim$ i Cumuli, $\sim$ i Cirro-strati, $\sim$ i Cumulo-strati $\sim$ i Nimbi, $\sim$ i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of May 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.611
Max. height of the Barometer occurred at 10 A. M. on the 1st	29.787
Min. height of the Barometer occurred at 5 P. M. on the 16th	29.450
Extreme range of the Barometer during the month	0.337
Mean of the daily Max. Pressures	29.673
Ditto ditto Min. ditto	29.539
Mean daily range of the Barometer during the month	0.134

	°
Mean Dry Bulb Thermometer for the month	87.1
Max. Temperature occurred at 2 P. M. on the 19th	101.5
Min. Temperature occurred at 1 & 2 A. M. on the 1st	72.9
Extreme range of the Temperature during the month	28.6
Mean of the daily Max. Temperature	96.0
Ditto ditto Min. ditto,	80.5
Mean daily range of the Temperature during the month	15.5

Mean Wet Bulb Thermometer for the month	80.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6.5
Computed Mean Dew-point for the month	76.7
Mean Dry Bulb Thermometer above computed mean Dew-point	10.4

	Inches.
Mean Elastic force of Vapour for the month	0.902

	Troy grain.
Mean Weight of Vapour for the month	9.60
Additional Weight of Vapour required for complete saturation	3.73
Mean degree of humidity for the month, complete saturation being unity	0.72

	°
Mean Max. Solar radiation Thermometer for the month	144.1

	Inches.
Rained 13 days.—Max. fall of rain during 24 hours	0.85
Total amount of rain during the month	1.16
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	0.99
Prevailing direction of the Wind S. S. W, S. & S. W.	

* Height 70 feet 10 inches above ground.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on. N. by E.	Rain on. N. N. E.	Rain on. N. E.	Rain on. E. N. E.	Rain on. E. by N.	Rain on. E.	Rain on. E. by S.	Rain on. E. S. E.	Rain on. S. E.	Rain on. S. S. E.	Rain on. S. by E.	Rain on. S.	Rain on. S. by W.	Rain on. S. S. W.	Rain on. S. W.	Rain on. W. S. W.	Rain on. W. by S.	Rain on. W.	Rain on. W. by N.	Rain on. W. N. W.	Rain on. N. W.	Rain on. N. N. W.	Rain on. N. by W.	Rain on.
Mid night								1	1	2	4	2	4	7	7	3									
1								1		2	3	3	3	6	8	1	4								
2	1	1								2	3	1	4	4	8	5				1					
3								1	1	1	2	1	2	6	6	6	1					1	1		
4								1		1	2		6	1	6	5	1				1				
5								1		1	4	1	4	7	1	6	5				1				
6										3	1	1	4	3	10	3	1				1				
7										2	3	1	2	2	8	7	7		1						
8										1	3	1	2	4	7	9	7		1						
9										1	2	1	1	7	9	7	7		1						
10									1	1	1	1	4	5	11	6	1								
11										1		4	2	2	10	11					1				
Noon.											1	2	2	7	9	9				1					
1											1	2	8	5	7	7				1					
2				1							1	1	7	9	5	7									
3										1		1	8	6	1	8	1			1	1				
4							1				3	1	13	8	4	1	1								
5									1	1	1	5	7	7	5	5	1								
6									1	1	1	1	10	5	1	6	1								
7										1	1	4	1	6	8	5	1								
8												4	9	7	5	5	6								
9					1	1	1			1	2	2	11	4	4	1	5	1					1		
10						1	1	1	1		1	4	10	3	4	4							1	1	
11						1				1	3	4	8	1	3	3									

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.739	29.804	29.680	0.124	87.8	97.0	80.5	16.5
2	.802	.860	.745	.115	86.6	95.3	81.2	14.1
3	.826	.875	.764	.111	85.2	96.7	80.5	16.2
4	.782	.847	.704	.143	81.9	87.0	80.0	7.0
5	.742	.812	.647	.165	84.2	90.1	79.4	10.7
6	.733	.769	.661	.108	81.2	88.3	79.0	9.3
7	.727	.793	.660	.133	82.5	88.0	79.0	9.0
8	.706	.766	.631	.135	81.8	87.6	77.0	10.6
9	.691	.745	.615	.130	82.5	90.2	78.0	12.2
10	.641	.689	.577	.112	80.7	88.0	77.0	11.0
11	.601	.645	.531	.114	83.7	91.9	79.0	12.9
12	.585	.635	.521	.114	85.8	93.4	80.3	13.1
13	.606	.652	.545	.107	86.9	93.0	81.5	11.5
14	.585	.636	.506	.130	85.4	94.8	82.0	12.8
15	.500	.571	.429	.142	83.3	89.0	80.0	9.0
16	.445	.500	.365	.135	84.1	90.0	79.5	10.5
17	.421	.482	.361	.121	81.9	86.5	80.0	6.5
18	.514	.594	.448	.146	79.6	83.3	78.0	5.3
19	.560	.613	.497	.116	82.5	86.0	78.7	7.3
20	.574	.618	.520	.098	84.9	89.5	81.2	8.3
21	.571	.620	.495	.125	86.7	94.4	81.2	13.2
22	.525	.583	.448	.135	86.0	93.6	81.8	11.8
23	.458	.512	.383	.129	85.1	91.9	81.5	10.4
24	.429	.475	.385	.090	82.3	87.5	79.4	8.1
25	.366	.426	.298	.128	83.9	89.5	80.0	9.5
26	.337	.395	.287	.108	83.9	90.7	81.4	9.3
27	.431	.513	.360	.153	81.0	83.5	79.5	4.0
28	.560	.636	.490	.146	83.6	90.0	79.5	10.5
29	.623	.687	.570	.117	82.1	90.3	78.0	12.3
30	.661	.718	.597	.121	83.5	89.5	80.2	9.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	80.0	7.8	75.3	12.5	0.862	9.16	4.44	0.67
2	80.6	6.0	77.0	9.6	.910	.69	3.45	.74
3	79.5	5.7	75.5	9.7	.868	.27	.34	.74
4	79.0	2.9	77.0	4.9	.910	.79	1.65	.86
5	79.6	4.6	76.4	7.8	.893	.56	2.68	.78
6	78.8	2.4	77.1	4.1	.913	.84	1.37	.88
7	79.5	3.0	77.4	5.1	.922	.91	.73	.85
8	78.4	3.4	76.0	5.8	.882	.48	.92	.83
9	78.2	4.3	75.2	7.3	.860	.24	2.40	.79
10	78.3	2.4	76.6	4.1	.899	.69	1.35	.88
11	80.0	3.7	77.4	6.3	.922	.89	2.18	.82
12	81.0	4.8	77.6	8.2	.928	.91	.92	.77
13	81.4	5.5	78.1	8.8	.943	10.04	3.21	.76
14	81.1	4.3	78.1	7.3	.943	.08	2.66	.80
15	80.1	3.2	77.9	5.4	.937	.06	1.87	.84
16	80.6	3.5	78.1	6.0	.943	.10	2.11	.83
17	79.9	2.0	78.5	3.4	.955	.29	1.15	.90
18	78.3	1.3	77.4	2.2	.922	9.97	0.72	.93
19	80.4	2.1	78.9	3.6	.967	10.39	1.25	.89
20	81.7	3.2	79.5	5.4	.986	.55	.94	.85
21	81.7	5.0	78.7	8.0	.961	.24	2.94	.78
22	81.8	4.2	78.9	7.1	.967	.32	.59	.80
23	81.5	3.6	79.0	6.1	.970	.37	.20	.83
24	80.5	1.8	79.2	3.1	.976	.50	1.08	.91
25	80.6	3.3	78.3	5.6	.949	.16	.97	.84
26	81.1	2.8	79.1	4.8	.973	.42	.71	.86
27	78.4	2.6	76.6	4.4	.899	9.69	.45	.87
28	79.7	3.9	77.0	6.6	.910	.75	2.28	.81
29	79.2	2.9	77.2	4.9	.901	.85	1.66	.86
30	80.1	3.4	77.7	5.8	.931	.98	2.02	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surgeon General's Office, Calcutta,
in the month of June 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.610	29.836	29.355	0.481	81.4	84.5	78.5	6.0
1	.598	.834	.350	.484	81.2	84.5	78.0	6.5
2	.587	.831	.339	.492	80.9	84.0	77.6	6.4
3	.577	.827	.333	.494	80.6	83.5	77.2	6.3
4	.571	.829	.321	.508	80.4	83.0	77.0	6.0
5	.583	.841	.329	.512	80.2	82.8	77.0	5.8
6	.589	.842	.337	.505	80.4	82.5	77.3	5.2
7	.616	.849	.357	.492	81.4	84.8	78.0	6.8
8	.630	.861	.354	.507	83.3	86.5	79.9	7.5
9	.637	.874	.355	.519	85.1	89.0	79.5	9.5
10	.633	.875	.349	.526	87.1	92.0	80.0	12.0
11	.626	.865	.345	.520	87.3	93.7	80.2	13.5
Noon.	.611	.841	.329	.512	87.4	95.5	80.0	15.5
1	.588	.822	.309	.513	87.9	96.7	79.0	17.7
2	.570	.809	.300	.509	87.8	97.0	79.7	17.3
3	.550	.820	.295	.525	86.6	94.7	80.0	14.7
4	.535	.764	.287	.477	86.0	95.0	79.4	15.6
5	.532	.766	.287	.479	85.7	94.4	79.5	14.9
6	.542	.776	.305	.471	85.0	92.0	79.5	12.5
7	.562	.795	.331	.464	83.7	90.0	79.0	11.0
8	.587	.813	.349	.464	83.1	88.0	79.0	9.0
9	.606	.830	.345	.465	82.5	86.0	79.0	7.0
10	.621	.848	.378	.470	82.0	85.5	79.0	6.5
11	.621	.847	.370	.477	81.6	85.0	78.0	7.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	79.5	1.9	78.2	3.2	0.946	10.19	1.08	0.90
1	79.3	1.9	78.0	3.0	.940	.13	.08	.90
2	79.2	1.7	78.0	2.9	.940	.13	0.97	.91
3	79.0	1.6	77.9	2.9	.937	.10	.91	.92
4	78.9	1.5	77.8	2.6	.934	.07	.87	.92
5	78.9	1.3	78.0	2.2	.940	.15	.73	.93
6	79.1	1.3	78.2	2.2	.946	.21	.73	.93
7	79.6	1.8	78.3	3.1	.949	.22	1.05	.91
8	80.4	2.9	78.4	4.9	.952	.21	.72	.86
9	80.8	4.3	77.8	7.3	.934	9.99	2.58	.80
10	81.2	5.9	77.7	9.4	.931	.92	3.41	.74
11	80.8	6.5	76.9	10.4	.908	.66	.75	.72
Noon.	80.8	6.6	76.8	10.6	.905	.61	.84	.71
1	81.2	6.7	77.2	10.7	.916	.73	.91	.71
2	80.9	6.9	76.8	11.0	.905	.61	.99	.71
3	80.7	5.9	77.2	9.4	.916	.77	.37	.74
4	80.6	5.4	76.8	9.2	.905	.65	.26	.75
5	80.6	5.1	77.0	8.7	.910	.71	.09	.76
6	80.3	4.7	77.0	8.0	.910	.73	2.80	.78
7	79.9	3.8	77.2	6.5	.916	.81	.26	.81
8	79.8	3.3	77.5	5.6	.925	.92	1.94	.84
9	79.8	2.7	77.9	4.6	.937	10.06	.58	.86
10	79.7	2.3	78.1	3.9	.943	.14	.33	.88
11	79.6	2.0	78.2	3.4	.946	.19	.15	.90

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Mile.	
1	148.0	...	S S E & S	...	175.0	~i to 7 A. M., ~i to 4 P. M., ~i to 7 P. M. B to 9 P. M., ~i to 11 P. M.
2	148.8	0.02	S	1.6	190.8	~i to 1 A. M. B to 5 A. M., ~i to 2 P. M. O to 6 P. M., ~i to 11 P. M. Brisk wind between 2 & 2½ P. M. T from 1½ to 3 P. M. Sheet L on N at 8 & 9 P. M. Light R at 3 P. M.
3	148.6	0.27	S by E & S E	6.0	100.7	S to 4 A. M., clouds of different kinds to 2 P. M. O to 9 P. M. S to 11 P. M. High wind from 2½ to 3 P. M. T between 2 & 3 P. M. L at midnight & 3 P. M. R between 3 & 4 P. M.
4	...	0.02	S E & S S E	...	78.0	S to 2 A. M. O to 6 A. M., ~i to 10 A. M. O to 3 P. M. S to 7 P. M., ~i to 11 P. M. T from 10 to 12 A. M. Light R after intervals from 11 A. M. to 3 P. M.
5	143.6	0.08	S S E & S S W	...	57.4	~i to 4 A. M., ~i to 12 A. M., ~i & ~i to 8 P. M., ~i to 11 P. M. T at 11½ A. M. & 2½ P. M. Light R between 11 & 12 A. M.
6	141.0	1.17	S by E & S S E	1.0	105.1	B to 5 A. M., ~i to 7 A. M., ~i to 10 A. M. O to 8 P. M. B to 11 P. M. Sheet L at 11½ P. M. T & R from 10½ A. M. to 2 P. M.
7	138.0	0.06	SSW, SE & S by E	...	110.9	~i to 1 A. M. O to 4 A. M., ~i to 12 A. M. S to 11 P. M. Sheet L at midnight Light R at 1½ & 5½ A. M.
8	137.0	0.08	SE, S by E & SSW	...	198.9	~i & ~i to 2 A. M. O to 9 A. M. ~i to 11 A. M. S to 1 P. M., ~i to 7 P. M. B to 11 P. M. Sheet L at 7½ P. M. Light R at 3 & 4½ A. M.
9	141.0	0.12	S by W & S W	2.9	154.6	Clouds of various kinds. Sheet L on S between 1 & 2 A. M., & 10 & 11 P. M. R at 7 P. M.

~i Cirri, —i Strati, ^i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi, ~i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
10	132.0	1.47	S, SSE & S by E	0.4	175.4	S to 3 A. M. O to 7 A. M., \i to 9 A. M., \i to 11 A. M. O to 3 P. M. S to 7 P. M., \i & \i to 11 P. M. T at 12 A. M. R at 6½, from 10½ to 12 A. M. & at 7½ P. M.
11	143.4	...	S by E, S & W S W	...	161.7	B to 3 A. M. O to 5 A. M., \i to 1 P. M. O to 4 P. M. S to 7 P. M. B to 11 P. M. Sheet L at 8 & 9 P. M.
12	145.3	0.05	W by S & S S W	...	180.1	S to 7 A. M., \i & \i to 4 P. M. S to 6 P. M., \i to 9 P. M. B to 11 P. M. T at 6 A. M. Sheet L on W from 7½ to 10 p. m. Light R between 1 & 2 A. M.
13	143.5	...	S by W	...	129.2	B to 4 A. M., \i & \i to 5 P. M. \i to 11 P. M. Sheet L on W S W at 9 P. M.
14	145.2	0.58	S by W & S E	2.8	140.1	B 4 A. M., \i to 7 A. M., \i to 1 P. M. O to 4 P. M., \i to 7 P. M. B to 11 P. M. Sheet L at Mid-night. T between 1 & 2 P. M. R between 1½ & 2½ P. M.
15	136.2	0.03	S E & E by S	2.0	173.6	B to 4 A. M., \i & \i to 12 A. M., \i to 3 P. M. O to 8 P. M. \i to 11 P. M. Sheet L on W at 11 P. M. Light R at 1, 4½ & 6 P. M.
16	141.0	0.14	E & E by N	1.6	223.8	B to 5 A. M., \i to 6 P. M. O to 11 P. M. Sheet L on S at 11 P. M. Slight R between 10 & 11 A. M. & at 7½ P. M.
17	...	0.61	E by N, ESE & SE	4.4	296.2	S to 2 A. M. O to 7 A. M., \i to 10 A. M. O to 6 P. M. S to 11 P. M. Sheet L on N W at 9 P. M. R after intervals. [ervals.
18	124.5	0.26	S S E & S E	...	264.3	Chiefly O. Slight R after in-
19	...	0.06	S S E & S	0.3	148.3	S to 4 A. M., \i to 10 A. M. O to 4 P. M. S to 7 P. M., \i to 11 P. M. Sheet L at 1 A. M. S & 10 P. M. Light R at 1½ 10½ & 12 A. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
20	136.0	...	S S E & S	...	161.8	B to 3 A. M., Clouds of different kinds to 9 A. M. S to 2 P. M. $\sim$ i & $\sim$ i to 7 P. M. B to 11 P. M. Sheet L on S W at midnight.
21	147.0	...	S by E & S	...	170.6	B to 2 A. M., $\sim$ i & $\sim$ i to 10 A. M., $\sim$ i to 8 P. M. B to 11 P. M. $\sim$ i to 9 A. M., $\sim$ i to 2 P. M. O to 4 P. M., $\sim$ i to 11 P. M. Sheet L on W at midnight.
22	148.0	...	S by E & S	...	155.9	B to 5 A. M., $\sim$ i to 11 A. M., $\sim$ i to 7 P. M. O to 11 P. M. T & L at 8 P. M. Slight R between 11 & 12 A. M. & 8 & 9 P. M.
23	146.2	0.18	S, S S E & S S W	...	150.7	O to 7 P. M. S to 11 P. M. Slight R between Midnight & 1 A. M. & from 2 to 7 P. M.
24	133.0	0.21	S by E & variable	...	101.6	O to 8 A. M., $\sim$ i to 5 P. M. S to 11 P. M. Slight R at 4½ A. M.
25	139.2	0.09	S by W & S S W & S	...	126.9	O to 9 A. M., $\sim$ i to 2 P. M. S to 11 P. M. D at 2½, 4, 8½, 9 & 11 P. M.
26	149.2	...	S by W, S & S W	...	128.4	O to 4 P. M., $\sim$ i to 11 P. M. Light R at 7, 9 & 11 A. M. 2, 3½ & 4 P. M.
27	111.7	0.08	S, S W & S S W	2.0	165.6	O to 10 A. M., $\sim$ i to 3 P. M. O to 11 P. M. Light R at 9½ A. M. 5, 6½ and 9 P. M.
28	147.0	0.03	S S W & S	0.3	177.7	O to 8 A. M., $\sim$ i to 3 P. M. O to 7 P. M., $\sim$ i to 11 P. M. T between midnight & 1 A. M. & 4 & 5 P. M.
29	144.7	1.28	S S E & variable	...	121.3	L between midnight & 1 A. M. and at 9 P. M. R after intervals.
30	143.5	...	S by E	...	127.0	$\sim$ i and $\sim$ i to 10 A. M., $\sim$ i & S to 11 P. M. T between 2 and 4 P. M. D at 8 A. M. 2½ and 3½ P. M.

$\sim$ i Cirri — i Strati, $\sim$ i Cumuli, $\sim$ i Cirro-strati, $\sim$ i Cumulo-strati $\sim$ i Nimbi,
 $\sim$ i Cirro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of June 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.591
Max. height of the Barometer occurred at 10 A. M. on the 3rd	29.875
Min. height of the Barometer occurred at 4 & 5 P. M. on the 26th	29.287
Extreme range of the Barometer during the month	0.588
Mean of the daily Max. Pressures	29.649
Ditto ditto Min. ditto	29.524
Mean daily range of the Barometer during the month	0.125
Mean Dry Bulb Thermometer for the month	83.7
Max. Temperature occurred at 2 P. M. on the 1st	97.0
Min. Temperature occurred at 4 & 5 A. M. on the 8th & 10th	77.0
Extreme range of the Temperature during the month	20.0
Mean of the daily Max. Temperature	90.2
Ditto ditto Min. ditto	79.8
Mean daily range of the Temperature during the month	10.4
Mean Wet Bulb Thermometer for the month	80.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	3.7
Computed Mean Dew-point for the month	77.4
Mean Dry Bulb Thermometer above computed mean Dew-point	6.3
Mean Elastic force of Vapour for the month	Inches. 0.922
Mean Weight of Vapour for the month	Troy grain. 9.89
Additional Weight of Vapour required for complete saturation	2.18
Mean degree of humidity for the month, complete saturation being unity	0.82
Mean Max. Solar radiation Thermometer for the month	140.9
Rained 24 days,—Max. fall of rain during 24 hours	Inches. 1.47
Total amount of rain during the month	6.89
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	6.08
Prevailing direction of the Wind	S., S. S. E. & S. by E.

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of June 1874.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on. N. by E.	Rain on. N. N. E.	Rain on. N. E.	Rain on. E. N. E.	Rain on. E. by N.	Rain on. E.	Rain on. E. by S.	Rain on. E. S. E.	Rain on. S. E.	Rain on. S. S. E.	Rain on. S. by E.	Rain on. S.	Rain on. S. by W.	Rain on. S. S. W.	Rain on. S. W.	Rain on. W. S. W.	Rain on. W. by S.	Rain on. W.	Rain on. W. by N.	Rain on. W. N. W.	Rain on. N. W.	Rain on. N. N. W.	Rain on. N. by W.	Rain on.
Mid night																									
1																									
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
Noon.																									
1																									
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3																									
4																									
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*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.685	29.733	29.621	0.112	83.8	90.0	80.0	10.0
2	.677	.732	.601	.131	84.9	92.0	80.0	12.0
3	.657	.712	.574	.138	83.6	88.4	80.0	8.4
4	.601	.658	.528	.130	84.2	91.0	79.6	11.4
5	.586	.622	.541	.081	84.1	87.8	81.0	6.8
6	.563	.600	.501	.099	84.1	87.5	81.2	6.3
7	.588	.641	.541	.100	85.7	92.3	80.5	11.8
8	.622	.679	.567	.112	85.3	91.5	80.5	11.0
9	.596	.643	.544	.099	85.2	93.4	80.2	13.2
10	.580	.630	.514	.116	84.2	90.3	81.0	9.3
11	.597	.645	.534	.111	83.8	90.0	81.0	9.0
12	.644	.718	.589	.129	83.1	87.3	79.9	7.4
13	.684	.739	.624	.115	83.5	89.0	79.5	9.5
14	.645	.684	.593	.091	84.2	89.3	80.0	9.3
15	.637	.684	.573	.111	84.1	88.8	81.6	7.2
16	.665	.728	.586	.142	83.3	87.4	79.7	7.7
17	.681	.728	.611	.117	85.1	92.0	79.5	12.5
18	.681	.722	.613	.109	87.0	93.8	81.0	12.8
19	.670	.737	.586	.151	87.2	92.8	81.8	11.0
20	.631	.692	.547	.145	86.7	94.2	82.0	12.2
21	.582	.641	.484	.157	86.7	94.0	82.5	11.5
22	.537	.583	.468	.115	85.8	91.2	82.2	9.0
23	.508	.551	.441	.110	83.6	88.6	80.8	7.8
24	.489	.562	.429	.133	82.6	87.5	79.8	7.7
25	.541	.599	.512	.087	81.2	87.4	79.5	7.9
26	.564	.616	.510	.106	82.0	87.5	79.4	8.1
27	.533	.599	.452	.147	82.6	88.0	79.4	8.6
28	.405	.479	.339	.140	80.5	83.2	79.2	4.0
29	.419	.537	.351	.186	82.2	86.5	79.0	7.5
30	.519	.575	.452	.123	83.4	87.6	79.6	8.0
31	.481	.526	.435	.091	80.7	84.5	78.2	6.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	80.4	3.4	78.0	5.8	0.940	10.07	2.03	0.83
2	80.4	4.5	77.2	7.7	.916	9.79	.70	.78
3	79.9	3.7	77.3	6.3	.919	.86	.17	.82
4	80.4	3.8	77.7	6.5	.931	.96	.28	.81
5	80.7	3.4	78.3	5.8	.949	10.16	.05	.83
6	81.0	3.1	78.8	5.3	.964	.34	1.87	.85
7	80.8	4.9	77.4	8.3	.922	9.85	2.95	.77
8	81.0	4.3	78.0	7.3	.940	10.05	.59	.80
9	81.3	3.9	78.6	6.6	.958	.23	.38	.81
10	81.3	2.9	79.3	4.9	.979	.48	1.76	.86
11	80.6	3.2	78.4	5.4	.952	.21	.89	.84
12	80.0	3.1	77.8	5.3	.934	.03	.83	.85
13	79.9	3.6	77.4	6.1	.922	9.89	2.11	.82
14	80.4	3.8	77.7	6.5	.931	.96	.28	.81
15	80.8	3.3	78.5	5.6	.955	10.23	1.98	.84
16	80.2	3.1	78.0	5.3	.940	.09	.84	.85
17	80.8	4.3	77.8	7.3	.934	9.99	2.58	.80
18	81.0	6.0	77.4	9.6	.922	.81	3.48	.74
19	81.4	5.8	77.9	9.3	.937	.98	.39	.75
20	81.2	5.5	77.9	8.8	.937	.98	.20	.76
21	81.4	5.3	78.2	8.5	.946	10.07	.11	.76
22	81.5	4.3	78.5	7.3	.955	.21	2.62	.80
23	80.5	3.1	78.3	5.3	.949	.18	1.85	.85
24	80.3	2.3	78.7	3.9	.961	.33	.35	.88
25	79.8	1.4	78.8	2.4	.964	.40	0.81	.93
26	80.4	1.6	79.3	2.7	.979	.53	.94	.92
27	80.3	2.3	78.7	3.9	.961	.33	1.35	.88
28	79.3	1.2	78.5	2.0	.955	.31	0.67	.94
29	79.1	3.1	76.9	5.3	.908	9.76	1.78	.85
30	81.0	2.4	79.3	4.1	.979	10.51	.45	.88
31	.792	1.5	78.1	2.6	.943	.16	0.88	.92

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.613	29.728	29.375	0.353	82.0	85.0	79.5	5.5
1	.603	.712	.361	.351	81.6	84.2	79.0	5.2
2	.592	.699	.355	.344	81.3	83.8	79.0	4.8
3	.580	.687	.351	.336	81.0	83.0	79.0	4.0
4	.572	.676	.357	.319	80.7	82.8	79.0	3.8
5	.583	.688	.366	.322	80.5	82.5	79.4	3.1
6	.597	.702	.386	.316	80.5	82.5	79.0	3.5
7	.612	.721	.385	.336	81.3	83.6	79.3	4.3
8	.625	.737	.401	.336	83.0	85.6	80.0	5.6
9	.632	.735	.431	.304	81.8	87.0	80.0	7.0
10	.650	.739	.434	.305	85.9	89.0	80.5	8.5
11	.619	.721	.427	.294	87.1	91.0	81.5	9.5
Noon.	.605	.715	.408	.307	87.9	92.3	83.0	9.3
1	.586	.688	.381	.307	87.7	93.4	79.5	13.9
2	.568	.678	.373	.305	87.8	93.5	79.4	14.1
3	.547	.655	.347	.308	87.5	94.0	78.2	15.8
4	.532	.631	.344	.287	87.5	94.2	79.0	15.2
5	.528	.624	.339	.285	86.8	93.5	79.0	14.5
6	.541	.629	.348	.281	85.7	92.5	79.1	13.4
7	.559	.665	.354	.311	84.4	89.7	78.6	11.1
8	.580	.688	.369	.319	83.6	88.5	78.5	10.0
9	.602	.706	.384	.322	83.1	87.4	78.8	8.6
10	.619	.725	.400	.325	82.6	86.0	78.5	7.5
11	.617	.728	.396	.332	82.1	85.5	78.5	7.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	80.0	2.0	78.6	3.4	0.958	10.32	1.15	0.90
1	79.8	1.8	78.5	3.1	.955	.29	.05	.91
2	79.6	1.7	78.4	2.9	.952	.25	0.99	.91
3	79.5	1.5	78.4	2.6	.952	.25	.89	.92
4	79.3	1.4	78.3	2.4	.949	.24	.80	.93
5	79.1	1.4	78.1	2.4	.943	.18	.80	.93
6	79.2	1.3	78.3	2.2	.949	.24	.74	.93
7	79.8	1.5	78.7	2.6	.961	.35	.89	.92
8	80.5	2.5	78.7	4.3	.961	.33	1.49	.87
9	81.0	3.8	78.3	6.5	.949	.14	2.32	.81
10	81.2	4.7	77.9	8.0	.937	.00	.87	.78
11	81.5	5.6	78.1	9.0	.943	.04	3.29	.75
Noon.	81.8	6.1	78.1	9.8	.943	.02	.62	.74
1	81.7	6.0	78.1	9.6	.943	.02	.54	.74
2	81.5	6.3	77.7	10.1	.931	9.90	.70	.73
3	81.2	6.3	77.4	10.1	.922	.81	.68	.73
4	81.4	6.1	77.7	9.8	.931	.90	.59	.73
5	81.2	5.6	77.8	9.0	.934	.95	.26	.75
6	81.0	4.7	77.7	8.0	.931	.94	2.86	.78
7	80.7	3.7	78.1	6.3	.943	10.10	.21	.82
8	80.6	3.0	78.5	5.1	.955	.25	1.78	.85
9	80.4	2.7	78.5	4.6	.955	.25	.61	.86
10	80.3	2.3	78.7	3.9	.961	.33	.35	.88
11	80.1	2.0	78.7	3.4	.961	.35	.16	.90

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.		General aspect of the Sky.
			Prevailing direction.	Max. Pressure Daily Velocity.	
	^o	Inches		lb	Mile.
1	137.8	0.04	S by E & SSE	...	116.6
2	151.0	0.08	S S E & S	...	84.4
3	134.0	0.21	S by E	...	152.3
4	137.0	0.04	S by E, S S W & S	...	137.2
5	120.0	0.02	S & S S W	...	166.0
6	128.5	...	S S W	0.6	223.4
7	141.2	...	S S W	1.2	240.3
8	144.2	...	S S W & S	...	203.3
9	150.0	...	S & S by E	...	131.4
10	142.0	0.31	S by E & S	2.8	155.0

∧ i Cirri — i Strati. ∩ i Cumuli, ∪ i Cirro-strati, ∩ i Cumulo-strati, ∪ i Nimbi,
∪ i Cirr-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
11	141.8	0.36	Sby E & SSE	2.8	160.8	B to 3 A. M., \i to 6 A. M., \i & \i to 2 P. M., \i & \i to 7 P. M. B to 11 P. M. R at 12 A. M. 2 & 2½ P. M.
12	142.0	0.05	SSE & SE	1.9	170.9	B to 4 A. M. S to 3 P. M., \i & \i to 8 P. M. B to 11 P. M. Sheet L on NW at 8 P. M. Light R at 11½, 12½ A. M., 1½ & 4½ P. M.
13	138.8	0.02	SE, S & S by W	0.6	170.6	B to 3 A. M., \i to 5 P. M., \i to 8 P. M. B to 11 P. M. Light R at 6½, 9 & 10 A. M.
14	129.5	...	S, SSW & S by W	0.4	189.0	B to 2 A. M., \i to 8 A. M., \i to 1 P. M. S to 9 P. M. B to 11 P. M. \i & \i to 3 A. M., \i to 8 A. M.
15	118.8	0.03	S by W & S	...	165.2	O to 1 P. M. S to 4 P. M. O to 11 P. M. Sheet L on S at 11 P. M. Light R at 10½, 12 A. M. & 6½ P. M.
16	142.7	0.48	S by E & S by W	0.8	140.2	O to 6 A. M., \i to 2 P. M. S to 11 P. M. T at 8½ P. M. Sheet L from 7 to 10 P. M. R between Midnight & 1, 9 & 10 A. M. at 1 & between 7 & 8 P. M.
17	145.0	...	S by W, S & SSW	...	89.0	\i & \i to 7 A. M., \i to 8 P. M. \i to 11 P. M. T at 4½ & 5 P. M. Sheet L at 7½, 10 & 11 P. M. D at 5½ P. M.
18	145.0	...	SSW & SE	...	77.6	S to 4 A. M., \i & \i to 11 P. M.
19	142.0	...	SbyE, SbyW & SE	...	89.7	\i to 11 A. M., \i to 9 P. M. B to 11 P. M. Sheet L at Midnight & at 1 A. M.
20	143.2	...	S by E	...	80.4	B to 3 A. M., \i & \i to 10 A. M., \i & \i to 7 P. M. B to 11 P. M. D at 12½ A. M.
21	147.0	0.92	S by E, SE & ESE	1.0	80.7	B to 6 A. M., \i to 7 P. M. \i to 9 P. M., \i to 11 P. M. T at 5½ P. M. R from 5 to 6½ P. M.
22	144.2	...	ESE & SE	...	89.1	\i to 1 A. M. S to 6 A. M. \i to 10 A. M., \i to 1 P. M. \i to 11 P. M.

\i Cirri,—i Strati. \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1874.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
23	134.0	0.12	S E, E N E & E	2.0	183.1	B to 4 A. M., ~i to 7 A. M., ~i to 3 P. M., ~i to 11 P. M. T at 1½ & 3 P. M. Light R at 1, 2, 3½, 7 & 9 P. M.
24	137.5	0.27	E & S E	1.2	240.1	Chiefly O. T & L at 11½ P. M. Slight R at 3, 6½, 7½, 9 A. M. 1½, 2 & 7½ P. M.
25	128.4	1.02	E S E & S E	1.0	180.3	O to 3 A. M., ~i to 7 A. M., ~i to 10 A. M. O to 11 P. M. T from 11 A. M. to 1½ P. M. R after intervals.
26	127.0	0.19	E S E, E & E by S	1.2	137.7	O to 5 A. M., ~i to 12 A. M. S to 11 P. M. T at 12½ A. M. Sheet L on N at 8 P. M. Slightly foggy at 10 P. M. Slight R at 1, 3, 4 A. M. & from 1 to 5½ P. M.
27	139.5	0.61	E by S, E & E by N	1.0	98.6	S to 3 A. M., ~i 12 A. M. O to 11 P. M. T from 12½ A. M., to 1½ P. M. L at 12½ A. M. R from 11 A. M. to 1 P. M.
28	...	0.45	E by N, N E & E S E	3.6	269.3	~i to 2 A. M. S to 6 A. M. O to 11 P. M. Brisk wind from 7 A. M. to 4 P. M. Slight R from 7 A. M. to 10½ P. M.
29	121.5	0.27	S E, S by E & S	3.0	382.4	O to 11 A. M., clouds of different kinds to 11 P. M. Brisk wind from 8½ A. M. to 3½ P. M. Slight R from 1 to 9 A. M. & at 11 P. M.
30	117.5	0.03	S & S by E	...	219.3	B to 2 a. m., ~i to 6 a. m. S to 4 p. m. O to 8 p. m., ~i to 11 p. m. Light R at 3½ & 6 p. m.
31	124.3	3.37	S by E, S W & S by E [W	0.5	127.7	~i to 9 a. m. O to 8 p. m., ~i to 11 p. m. T at 12 a. m. & 2½ p. m. Slightly foggy at 10 & 11 p. m. R from 11½ a. m. to 5 p. m.

~i Cirri —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of July 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.589
Max. height of the Barometer occurred at 10 A. M. on the 13th	29.739
Min. height of the Barometer occurred at 5 P. M. on the 28th	29.339
Extreme range of the Barometer during the month	0.400
Mean of the daily Max. Pressures	29.645
Ditto ditto Min. ditto	29.525
Mean daily range of the Barometer during the month	0.120

	°
Mean Dry Bulb Thermometer for the month	84.0
Max. Temperature occurred at 4 P. M. on the 20th	94.2
Min. Temperature occurred at 3 P. M. on the 31st	78.2
Extreme range of the Temperature during the month	16.0
Mean of the daily Max. Temperature	89.5
Ditto ditto Min. ditto,	80.3
Mean daily range of the Temperature during the month	9.2

Mean Wet Bulb Thermometer for the month	80.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	3.5
Computed Mean Dew-point for the month	78.0
Mean Dry Bulb Thermometer above computed mean Dew-point	6.0

	Inches.
Mean Elastic force of Vapour for the month	0.940

	Troy grain.
Mean Weight of Vapour for the month	10.07
Additional Weight of Vapour required for complete saturation	2.10
Mean degree of humidity for the month, complete saturation being unity	0.83

	°
Mean Max. Solar radiation Thermometer for the month	136.5

	Inches.
Rained 24 days.—Max. fall of rain during 24 hours	3.37
Total amount of rain during the month	8.89
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	7.79
Prevailing direction of the Wind S. by E. & S.	

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of July 1874.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on. N. by E.	Rain on. N. N. E.	Rain on. N. E.	Rain on. E. N. E.	Rain on. E. by N.	Rain on. E.	Rain on. E. by S.	Rain on. E. S. E.	Rain on. S. E.	Rain on. S. S. E.	Rain on. S. by E.	Rain on. S.	Rain on. S. by W.	Rain on. S. S. W.	Rain on. W. by S.	Rain on. W.	Rain on. W. by N.	Rain on. W. N. W.	Rain on. N. W.	Rain on. N. N. W.	Rain on. N. by W.	Rain on.
Midnight						1	1	1	2	4	12	9	5	3	3								
1						1	1	1	4	3	12	9	5	1	3	3							
2						1	1	1	3	3	12	10	4	1	4	4							
3							1	1	3	1	12	11	4	1	4	4							
4							1	1	2	3	12	10	4	1	3	3							
5							1	1	3	3	12	10	4	1	3	3							
6							1	1	3	1	3	10	1	5	3	3							
7							1	1	3	3	1	9	4	1	5	5							
8						1	3	1	1	2	12	1	5	1	5	5	1	1					
9						1	1	1	1	1	12	3	3	1	4	5	3						
10						1	1	1	1	1	12	3	4	1	4	4	1	4					
11							2	1	1	5	4	1	2	5	1	5	4	1	1				
Noon.						1	4	2		7	1	2	2	1	6	2	5	1	3	1			
1						1	1	1	1	1	12	4	1	1	1	6	1	1					
2						1	1	1	1	1	12	4	1	1	1	1	1	1					
3						1	1	1	1	1	12	1	1	1	1	1	1	1					
4							3	1	1	1	12	1	1	1	1	1	1	1					
5							2		1	1	12	1	1	1	1	1	1	1					
6	1	1					1	1	1	1	12	4	4	1	4	5	3	1					
7							2	1	1	1	12	4	4	1	5	3	3	1					
8						1			3	3	12	4	6	5	1	4	4						
9							2	1	1	1	12	6	5	3	3	4	3						
10							2	1	1	1	12	7	5	5	4	4	3						
11							2	1	1	4	12	8	1	5	4	3							

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.439	29.499	29.365	0.134	81.9	86.5	78.0	8.5
2	.425	.511	.347	.164	82.0	87.4	78.9	8.5
3	.585	.679	.496	.183	82.7	88.5	79.0	9.5
4	.640	.677	.554	.123	79.8	82.0	78.5	3.5
5	.628	.671	.557	.114	82.1	88.0	78.0	10.0
6	.653	.702	.597	.105	82.6	86.8	80.0	6.8
7	.669	.714	.612	.102	83.6	90.0	79.5	10.5
8	.624	.687	.546	.141	85.1	92.0	80.5	11.5
9	.561	.605	.507	.098	81.4	90.8	81.5	9.3
10	.580	.627	.518	.109	81.8	86.2	77.8	8.4
11	.572	.630	.501	.129	83.0	88.2	79.0	9.2
12	.571	.625	.518	.107	83.6	88.8	80.0	8.8
13	.583	.631	.505	.126	82.7	87.2	80.2	7.0
14	.572	.613	.507	.106	82.9	88.3	79.8	8.5
15	.584	.628	.542	.086	82.1	86.0	79.0	7.0
16	.604	.656	.561	.095	81.6	86.8	78.0	8.8
17	.629	.686	.571	.115	83.2	88.8	79.5	9.3
18	.576	.657	.497	.160	84.4	90.5	80.0	10.5
19	.553	.594	.496	.098	84.6	91.0	80.5	10.5
20	.561	.604	.489	.115	83.8	88.3	80.0	8.3
21	.547	.589	.492	.097	83.4	91.5	81.0	10.5
22	.513	.559	.443	.116	81.0	81.5	80.2	1.3
23	.559	.605	.514	.091	81.2	87.0	77.5	9.5
24	.567	.623	.508	.115	83.8	89.0	79.5	9.5
25	.498	.547	.433	.114	83.8	87.8	81.5	6.3
26	.454	.496	.387	.109	82.6	86.5	79.8	6.7
27	.549	.642	.473	.169	89.6	84.4	78.0	6.4
28	.650	.763	.614	.149	81.4	87.0	77.8	9.2
29	.764	.818	.708	.110	83.7	89.0	79.3	9.7
30	.743	.802	.664	.138	85.1	91.0	80.0	11.0
31	.706	.770	.620	.150	85.7	92.5	81.5	11.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.1	2.8	77.1	4.8	0.913	9.82	1.62	0.86
2	79.5	2.5	77.7	4.3	.931	10.02	.45	.87
3	80.5	2.2	79.0	3.7	.970	.42	.30	.89
4	78.9	0.9	78.3	1.5	.949	.24	0.51	.95
5	79.9	2.2	78.4	3.7	.952	.23	1.28	.89
6	80.6	2.0	79.2	3.4	.976	.50	.18	.90
7	80.6	3.0	78.5	5.1	.955	.25	.78	.85
8	81.2	3.9	78.5	6.6	.955	.21	2.36	.81
9	81.4	3.0	79.3	5.1	.979	.48	1.83	.85
10	79.8	2.0	78.4	3.4	.952	.25	.15	.90
11	80.0	3.0	77.9	5.1	.937	.06	.76	.85
12	80.6	3.0	78.5	5.1	.955	.25	.78	.85
13	80.1	2.6	78.3	4.4	.949	.20	.52	.87
14	80.1	2.8	78.1	4.8	.943	.12	.67	.86
15	79.8	2.3	78.2	3.9	.946	.17	.34	.88
16	79.4	2.2	77.9	3.7	.937	.08	.26	.89
17	80.4	2.8	78.4	4.8	.952	.21	.68	.86
18	80.9	3.5	78.4	6.0	.952	.19	2.12	.83
19	81.1	3.5	78.6	6.0	.958	.26	.13	.83
20	81.1	2.7	79.2	4.6	.976	.45	1.65	.86
21	80.9	2.5	79.1	4.3	.973	.45	.51	.87
22	79.9	1.1	79.1	1.9	.973	.49	0.65	.94
23	79.1	2.1	77.6	3.6	.928	9.99	1.22	.89
24	80.2	3.6	77.7	6.1	.931	.98	2.12	.83
25	80.6	3.2	78.4	5.4	.952	10.21	1.89	.81
26	80.5	2.1	79.0	3.6	.970	.42	.26	.89
27	78.2	2.4	76.5	4.1	.896	9.67	.34	.88
28	79.0	2.4	77.3	4.1	.919	.90	.37	.88
29	80.0	3.7	77.4	6.3	.922	.89	2.18	.82
30	80.7	4.4	77.6	7.5	.928	.91	.66	.79
31	80.9	4.8	77.5	8.2	.925	.88	.92	.77

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements-
dependent thereon.

Hour	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.608	29.776	29.452	0.324	81.0	83.0	78.0	5.0
1	.596	.768	.428	.340	80.8	83.5	78.0	5.5
2	.584	.753	.413	.340	80.5	82.5	77.5	5.0
3	.573	.752	.402	.350	80.2	82.0	77.5	4.5
4	.567	.751	.389	.362	80.0	81.8	77.5	4.3
5	.576	.753	.405	.348	79.8	81.6	77.8	3.8
6	.588	.767	.426	.341	79.8	81.6	77.8	3.8
7	.604	.791	.450	.341	80.6	82.5	78.0	4.5
8	.621	.808	.451	.357	81.9	84.5	78.0	6.5
9	.629	.806	.460	.346	83.3	86.2	78.2	8.0
10	.628	.818	.454	.364	84.9	88.5	79.6	8.9
11	.622	.812	.446	.366	85.7	90.5	79.9	10.6
Noon.	.603	.790	.417	.373	86.3	90.5	79.3	11.2
1	.585	.774	.396	.378	86.7	91.5	80.1	11.4
2	.560	.746	.372	.374	86.6	92.0	79.5	12.5
3	.544	.729	.365	.364	86.0	92.5	79.1	13.4
4	.532	.716	.347	.369	85.9	91.7	78.7	13.0
5	.550	.708	.361	.347	85.0	91.0	79.0	12.0
6	.541	.710	.379	.331	84.1	88.0	79.0	9.0
7	.564	.727	.405	.322	83.1	87.1	79.0	8.1
8	.586	.751	.423	.328	82.4	85.8	78.5	7.3
9	.607	.779	.442	.337	82.0	85.0	78.5	6.5
10	.620	.786	.448	.338	81.7	84.4	78.5	5.9
11	.622	.787	.457	.330	81.5	83.5	78.5	5.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	79.6	1.4	78.6	2.4	.958	10.34	0.89	0.93
1	79.5	1.3	78.6	2.2	.958	.34	.73	.93
2	79.3	1.2	78.5	2.0	.955	.31	.67	.94
3	79.0	1.2	78.2	2.0	.946	.21	.67	.94
4	78.9	1.1	78.1	1.9	.943	.18	.63	.94
5	78.9	0.9	78.3	1.5	.949	.24	.51	.95
6	78.9	0.9	78.3	1.5	.949	.24	.51	.95
7	79.5	1.1	78.7	1.9	.961	.37	.64	.94
8	80.1	1.8	78.8	3.1	.964	.38	1.06	.91
9	80.5	2.8	78.5	4.8	.955	.25	.68	.86
10	81.0	3.9	78.3	6.6	.949	.14	2.35	.81
11	81.2	4.5	78.0	7.7	.940	.03	.77	.78
Noon.	81.4	4.9	78.0	8.3	.940	.03	.99	.77
1	81.4	5.3	78.2	8.5	.946	.07	3.11	.76
2	81.4	5.2	78.3	8.3	.949	.12	.02	.77
3	81.2	4.8	77.8	8.2	.934	9.97	2.94	.77
4	81.1	4.8	77.7	8.2	.931	.94	.93	.77
5	80.8	4.2	77.9	7.1	.937	10.02	.51	.80
6	80.4	3.7	77.8	6.3	.934	.01	.20	.82
7	80.2	2.9	78.2	4.9	.946	.15	1.71	.86
8	79.9	2.5	78.1	4.3	.943	.14	.47	.87
9	79.9	2.1	78.4	3.6	.952	.23	.24	.89
10	79.9	1.8	78.6	3.1	.958	.32	.05	.91
11	79.8	1.7	78.6	2.9	.958	.32	0.99	.91

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	^o Inches			lb	Mile.	
1	139.0		S by W, E by N & E	1.5	121.6	~i to 4 A. M. S to 3 P. M., ~i to 7 P. M., ~i to 11 P. M. Brisk wind from 9½ A. M. to 1½ P. M. Slightly foggy at midnight D at 5½, 6½, 9½ A. M. & 1 P. M.
2	136.0	0.17	E N E, E & S E	6.0	256.0	~i to 8 A. M., ~i to 4 P. M. O to 11 P. M. Strong wind from 8 A. M. to 6½ P. M. Slight R at 4½, 8½, 11½, 12½ A. M. 2½ & 3½ P. M.
3	146.5	0.52	S E & S by E	1.0	250.0	O to 7 A. M., ~i to 2 P. M. O to 8 P. M. B to 11 P. M. T between 2 & 3 P. M. R at 4, 6 A. M. 1½ & 2½ P. M.
4	...	0.35	S S E	1.0	109.6	~i to 4 A. M. O to 11 P. M. T at 11 A. M. Slight R after intervals.
5	140.0	1.43	S S E & S	0.5	145.1	O to 10 A. M., ~i & ~i to 6 P. M. B to 11 P. M. R after intervals.
6	144.0	0.40	S S E	...	150.3	B to 2 A. M., ~i to 7 P. M. B to 11 P. M. T at 3 P. M. Sheet L on W at 11 P. M. Slight R at 7, 8 12½ A. M. & from 1½ to 3 P. M.
7	141.2	0.03	S S E & S E	...	162.0	B to 4 A. M., ~i to 8 A. M., ~i to 6 P. M., ~i to 11 P. M. Sheet L from 6½ to 11 P. M. Light R at 7½ A. M. & 4½ P. M.
8	144.2	0.32	S S E & S by E	...	104.7	~i to 6 A. M., ~i & ~i to 5 P. M. O to 11 P. M. T at 6½ P. M. Sheet Lat midnight, 9 & 10 P. M. R from 5½ to 7 P. M.
9	140.0	0.21	S by E & S E	0.8	90.8	O to 7 A. M., ~i to 1 P. M. O to 7 P. M. S to 11 P. M. T from 1½ to 4 P. M. Sheet L at midnight 4 A. M. 10 & 11 P. M. Slight R at 4½ A. M. 2½, 3, 4½ & 9½ P. M.
10	138.0	0.71	SE, S S W & S S E	0.8	101.3	~i to 1 A. M. O to 4 A. M., ~i to 7 A. M., ~i to 11 A. M. O to 4 P. M., ~i to 7 P. M. S to 11 P. M. T at 11½ A. M., & 1½ P. M. R. from 3 to 4½ & 11½ A. M. to 4 P. M.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning,
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	Wind.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles.	
11	...	...	SSE, S & S by E	...	91.9	B to 1 A. M., ☿ to 1 P. M. O to 3 P. M., ☿ to 7 P. M. B to 11 P. M. D at 2 P. M.
12	138.8	...	S by E & SSE	...	116.4	B to 5 A. M., ☿ to 1 P. M. S to 7 P. M., ☿ to 9 P. M. B to 11 P. M.
13	117.0	0.11	S by E, SSE & S	...	117.6	B to 2 A. M., ☿ to 7 A. M., ☿ to 12 A. M. O to 3 P. M., ☿ to 7 P. M. B to 11 P. M. Slight R between 10½ & 12½ A. M.
14	140.7	0.03	S by E	...	152.3	B to 1 A. M., ☿ to 11 P. M. T at 10½ P. M. Light R at 11¼ A. M. & 11 P. M.
15	134.0	0.10	S by E & SSE	1.0	129.2	Clouds of different kinds Slight R at 1, 10½, 11½ A. M. 3¼, 4¼, 5¼ & 6 P. M.
16	137.0	0.33	SSE & S by E	0.2	161.5	Clouds of different kinds. Slight R at 2¼, 10½ A. M. 1½, 3½, 4½ & 10½ P. M.
17	141.5	0.23	S	...	161.7	Clouds of various kinds. Slight R at 4½, 8½, A. M., & 2½ P. M.
18	147.3	...	S, S by E & SSE	...	131.1	B to 4 A. M., ☿ to 7 A. M., ☿ to 5 P. M., ☿ to 11 P. M. Sheet L on W between 10 & 11 P. M. D at 4¼ P. M.
19	140.0	0.09	SSE, SE & S by E	...	120.5	B to 5 A. M., ☿ & ☿ to 2 P. M. S to 11 P. M. T at 12¼ A. M. Sheet L from midnight to 2 A. M. & 9 to 11 P. M. R at 7 P. M.
20	149.0	0.32	S by E & SSE	1.0	115.0	B to 3 A. M. S to 10 A. M., ☿ to 3 P. M. S to 7 P. M. O to 11 P. M. T between 1 & 2 P. M. Sheet L at midnight 8 & 11 P. M. R at 5, 11½ A. M. & 1 P. M.
21	147.0	1.25	S by E	0.8	100.2	S to 2 A. M. B to 4 A. M., ☿ to 7 A. M., ☿ to 2 P. M. O to 6 P. M., ☿ to 11 P. M. T from 2½ to 4 P. M. L between 3 & 4 P. M. R at 1 A. M. & from 2 to 5 P. M.

☿ Cirri, — i Strati, ☿ i Cumuli, ☿ i Cirro-strati, ☿ i Cumulo-strati, ☿ i Nimbi, ☿ i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1874.*

* Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
22	0	...	S by E & S S E	...	61.8	O. T at 7½ & 8½ A. M. Sheet L at 1, 3 & 4 A. M. R from 4½ to 10 A. M. at 1, 2, 9, 10½ & 11 P. M.
23	138.0	2.96	S S W & S	0.7	143.0	O to 9 A. M., ~i to 4 P. M., ~i to 11 P. M. R after intervals.
24	141.2	...	S & S S W	...	148.3	~i to 1 A. M. B to 6 A. M., ~i & ~i to 11 A. M., ~i & ~i to 5 P. M., ~i & ~i to 11 P. M. Sheet L on S between 7 & 8 P. M. D at 2½ P. M.
25	128.8	...	S, S S W & S by W	...	141.4	S to 6 A. M. O to 11 A. M. ~i to 5 P. M., ~i to 11 P. M. L on S E at 3 A. M.
26	120.0	0.27	S by W, S S E & S	...	67.3	Clouds of different kinds. Slight R after intervals.
27	122.0	0.28	S & S by E	0.8	176.4	Scuds to 7 A. M. O to 1 P. M., ~i to 5 P. M. Scuds to 7 P. M. ~i to 11 P. M. Slight R from 1½ A. M. to 1½ P. M.
28	138.0	0.08	S by E	0.5	161.8	S to 5 A. M. O to 9 A. M., ~i to 4 P. M., ~i to 7 P. M. B to 11 P. M. Light R at midnight, 6, 7, 7½, A. M. 4 & 4½ P. M.
29	145.0	...	S by E & S by W	...	96.1	B to 5 A. M., ~i to 6 P. M. ~i & ~i to 11 P. M.
30	147.5	...	S & S by E	...	80.3	~i to 4 A. M., B to 7 A. M. ~i to 6 P. M. ~i to 11 P. M. Sheet L between 10 & 11 P. M. D at 9 A. M.
31	145.6	...	S, S by E & S by W	...	87.2	~i to 7 A. M., ~i to 6 P. M. ~i to 11 P. M. T between 5 & 6 P. M. Sheet L on W at 7 P. M. D at 5 P. M.

~i Cirri —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati ~i Nimbi.
~i Cirro-Cumuli, B clear, S strati, O overcast, T thunder, L lightning
R rain, D drizzle.

* Fell on the 22nd & 23rd.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of August 1874.*

MONTHLY RESULTS.

		Inches.
Mean height of the Barometer for the month	...	29.587
Max. height of the Barometer occurred at 10 A. M. on the 29th	...	29.818
Min. height of the Barometer occurred at 4 P. M. on the 2nd	...	29.347
Extreme range of the Barometer during the month	...	0.471
Mean of the daily Max. Pressures	...	29.642
Ditto ditto Min. ditto	...	29.521
Mean daily range of the Barometer during the month	...	0.121

		°
Mean Dry Bulb Thermometer for the month	...	82.9
Max. Temperature occurred at 3 P. M. on the 31st	...	92.5
Min. Temperature occurred at 2, 3 & 4 A. M. on the 23rd	...	77.5
Extreme range of the Temperature during the month	...	15.0
Mean of the daily Max. Temperature	...	88.0
Ditto ditto Min. ditto	...	79.5
Mean daily range of the Temperature during the month	...	8.5

Mean Wet Bulb Thermometer for the month	...	80.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	...	2.7
Computed Mean Dew-point for the month	...	78.3
Mean Dry Bulb Thermometer above computed mean Dew-point	...	4.6

		Inches.
Mean Elastic force of Vapour for the month	...	0.949

		Troy grain.
Mean Weight of Vapour for the month	...	10.18
Additional Weight of Vapour required for complete saturation	...	1.61
Mean degree of humidity for the month, complete saturation being unity	...	0.86

		°
Mean Max. Solar radiation Thermometer for the month	...	138.8

		Inches.
Rained 28 days.—Max. fall of rain during 24 hours	...	1.43
Total amount of rain during the month	...	10.19
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	...	9.22
Prevailing direction of the Wind	... S. by E, S. S. E. & S.	

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of August 1874.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on. N. by E.	Rain on. N. N. E.	Rain on. N. E.	Rain on. E. N. E.	Rain on. E. by N.	Rain on. E.	Rain on. E. by S.	Rain on. E. S. E.	Rain on. S. E.	Rain on. S. S. E.	Rain on. S. by E.	Rain on. S.	Rain on. S. by W.	Rain on. S. S. W.	Rain on. S. W.	Rain on. W. S. W.	Rain on. W. by S.	Rain on. W.	Rain on. W. by N.	Rain on. W. N. W.	Rain on. N. W.	Rain on. N. N. W.	Rain on. N. by W.	Rain on.
Midnight							1			1	7	113	1	5						1	1				
1					1						1	11	1	7											
2					1						1	11	1	6											
3					1						1	10	1	6											
4					1	1					1	10	1	6											
5							1	1			1	10	1	6											
6								1			1	10	1	6											
7					1			1			1	10	1	6											
8			1	1	1			1			1	10	1	6											
9			1	1		1		1	1		1	10	1	6											
10	1	1			1			1			1	10	1	6											
11					1				1		1	10	1	6											
Noon.					1			2	2		2	1	9	2	9	2		1	4						
1						1	1	1	1		1	1	3	10	3	9	1	1	1						
2						1	1	1	1		1	1	3	10	3	9	1	1	1						
3						1	1	1	1		1	1	3	10	3	9	1	1	1						
4						1			1		1	1	3	10	3	9	1	1	1						
5						1					1	1	3	10	3	9	1	1	1						
6						1					1	1	3	10	3	9	1	1	1						
7								1			1	1	3	10	3	9	1	1	1						
8								1			1	1	3	10	3	9	1	1	1						
9								1			1	1	3	10	3	9	1	1	1						
10								1			1	1	3	10	3	9	1	1	1						
11								1			1	1	3	10	3	9	1	1	1						

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahl.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.700	29.760	29.634	0.126	86.5	92.0	81.5	10.5
2	.745	.804	.663	.141	85.9	91.5	81.5	10.0
3	.738	.793	.654	.139	85.7	91.6	81.7	9.9
4	.733	.785	.657	.128	83.5	89.8	77.5	12.3
5	.740	.796	.671	.125	84.4	91.2	81.8	9.4
6	.727	.783	.654	.129	81.9	89.5	78.0	11.5
7	.710	.770	.636	.134	81.5	87.0	79.0	8.0
8	.697	.750	.639	.111	82.2	88.7	80.0	8.7
9	.708	.836	.701	.135	79.0	80.4	77.3	3.1
10	.818	.858	.779	.079	79.2	84.5	76.5	8.0
11	.816	.869	.760	.109	78.8	80.6	75.5	5.1
12	.772	.825	.717	.108	80.5	82.5	77.5	5.0
13	.737	.787	.675	.112	81.9	86.5	79.9	6.6
14	.711	.753	.643	.110	83.5	87.6	80.3	7.3
15	.731	.786	.668	.118	83.4	89.0	79.5	9.5
16	.759	.816	.696	.120	83.0	87.0	80.5	6.5
17	.726	.786	.645	.141	83.7	90.5	79.5	11.0
18	.656	.718	.580	.138	84.4	90.0	80.0	10.0
19	.662	.714	.601	.113	84.0	90.3	81.0	9.3
20	.696	.768	.635	.133	84.8	91.7	80.5	11.2
21	.642	.701	.557	.144	85.4	91.6	81.0	10.6
22	.617	.724	.569	.155	86.8	93.7	81.5	12.2
23	.601	.657	.517	.140	84.9	91.8	81.5	10.3
24	.595	.651	.545	.106	81.3	85.5	79.0	6.5
25	.632	.689	.581	.108	80.8	83.8	78.5	5.3
26	.711	.779	.651	.128	79.1	81.0	77.5	3.5
27	.734	.790	.679	.111	82.9	88.5	78.4	10.1
28	.722	.790	.653	.137	83.2	87.5	80.0	7.5
29	.682	.746	.610	.136	83.0	87.5	80.0	7.5
30	.646	.696	.582	.114	80.9	87.5	77.2	10.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	81.0	5.5	77.7	8.8	.931	9.92	3.18	.76
2	80.6	5.3	76.9	9.0	.908	.68	.19	.75
3	81.0	4.7	77.7	8.0	.931	.94	2.86	.78
4	79.9	3.6	77.4	6.1	.922	.89	.11	.82
5	81.0	3.4	78.6	5.8	.958	10.26	.05	.83
6	79.5	2.4	77.8	4.1	.934	.05	1.39	.88
7	79.3	2.2	77.8	3.7	.934	.05	.26	.89
8	79.9	2.3	78.3	3.9	.949	.20	.34	.88
9	77.5	1.5	76.4	2.6	.893	9.66	0.84	.92
10	77.9	1.3	77.0	2.2	.910	.85	.71	.93
11	77.4	1.4	76.1	2.4	.893	.68	.76	.93
12	79.1	1.4	78.1	2.4	.943	10.18	.80	.93
13	80.2	1.7	79.0	2.9	.970	.44	1.00	.91
14	81.0	2.5	79.2	4.3	.976	.48	.52	.87
15	80.5	2.9	78.5	4.9	.955	.25	.71	.86
16	80.7	2.3	79.1	3.9	.973	.45	.37	.90
17	80.2	3.5	77.7	6.0	.931	9.98	2.09	.83
18	80.6	3.8	77.9	6.5	.937	10.02	.29	.81
19	81.0	3.0	78.9	5.1	.967	.37	1.80	.85
20	81.0	3.8	78.3	6.5	.949	.14	2.32	.81
21	81.1	4.3	78.1	7.3	.943	.08	.60	.80
22	81.6	5.2	78.5	8.3	.955	.18	3.03	.77
23	81.3	3.6	78.8	6.1	.964	.31	2.18	.83
24	79.5	1.8	78.2	3.1	.946	.19	1.05	.91
25	79.4	1.4	78.4	2.4	.952	.27	0.80	.93
26	78.2	0.9	77.6	1.5	.928	.63	.50	.95
27	80.2	2.7	78.3	4.6	.949	.18	1.61	.86
28	80.4	2.8	78.4	4.8	.952	.21	.68	.86
29	80.1	2.9	78.1	4.9	.943	.12	.70	.86
30	78.6	2.3	77.0	3.9	.910	9.81	.29	.88

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.724	29.841	29.608	0.233	81.3	85.1	78.0	7.1
1	.713	.834	.591	.243	81.0	84.7	78.0	6.7
2	.703	.810	.580	.230	80.8	84.4	77.7	6.7
3	.695	.795	.560	.235	80.6	84.0	77.5	6.5
4	.691	.788	.562	.226	80.3	83.7	77.0	6.7
5	.700	.799	.573	.226	80.1	83.3	76.6	6.7
6	.713	.813	.580	.233	79.9	83.0	76.5	6.5
7	.729	.867	.599	.268	80.5	83.3	76.2	7.1
8	.748	.861	.624	.237	82.2	85.4	75.5	9.9
9	.761	.869	.634	.235	83.7	88.3	77.5	10.8
10	.761	.864	.646	.218	85.0	89.2	77.5	11.7
11	.748	.853	.628	.225	86.0	90.5	78.0	12.5
Noon.	.729	.841	.607	.234	86.6	91.3	78.4	12.9
1	.701	.840	.576	.264	86.8	91.7	78.0	13.7
2	.678	.825	.544	.281	86.4	92.8	76.5	16.3
3	.658	.802	.517	.285	85.7	93.7	77.6	16.1
4	.648	.795	.517	.278	85.0	93.3	78.0	15.3
5	.649	.782	.530	.252	84.1	92.5	78.2	14.3
6	.663	.779	.551	.228	83.2	89.5	78.8	10.7
7	.681	.797	.576	.221	82.5	87.0	78.3	8.7
8	.710	.820	.599	.221	82.2	86.5	78.1	8.4
9	.731	.846	.624	.222	81.9	86.0	78.0	8.0
10	.739	.858	.618	.240	81.7	85.5	78.0	7.5
11	.733	.853	.618	.235	81.4	85.4	77.9	7.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.8	1.5	78.7	2.6	.961	10.35	0.89	0.92
1	79.7	1.3	78.8	2.2	.964	.40	.74	.93
2	79.5	1.3	78.6	2.2	.958	.34	.73	.93
3	79.3	1.3	78.4	2.2	.952	.27	.74	.93
4	79.1	1.2	78.3	2.0	.949	.24	.67	.94
5	78.9	1.2	78.1	2.0	.943	.18	.66	.94
6	78.8	1.1	78.0	1.9	.940	.15	.63	.94
7	79.3	1.2	78.5	2.0	.955	.31	.67	.94
8	80.0	2.2	78.5	3.7	.955	.27	1.27	.89
9	80.5	3.2	78.3	5.4	.949	.18	.89	.84
10	80.6	4.4	77.5	7.5	.925	9.88	2.65	.79
11	81.0	5.0	77.5	8.5	.925	.86	3.05	.76
Noon.	81.1	5.5	77.8	8.8	.934	.95	.19	.76
1	81.0	5.8	77.5	9.3	.925	.86	.35	.75
2	80.8	5.6	76.9	9.5	.908	.66	.40	.74
3	80.6	5.1	77.0	8.7	.910	.71	.09	.76
4	80.5	4.5	77.3	7.7	.919	.82	2.71	.78
5	80.2	3.9	77.5	6.6	.925	.90	.31	.81
6	80.1	3.1	77.9	5.3	.937	10.06	1.83	.85
7	80.0	2.5	78.2	4.3	.946	.17	.47	.87
8	79.9	2.3	78.3	3.9	.949	.20	.34	.88
9	79.9	2.0	78.5	3.4	.955	.29	.15	.90
10	79.7	2.0	78.3	3.4	.949	.22	.15	.90
11	79.7	1.7	78.5	2.9	.955	.29	0.98	.91

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mile.	
1	144.0	...	S by W & S by E	...	75.6	~i to 7 A. M. ~i to 8 P. M., B to 11 P. M. Sheet L on W from 7 to 10 P. M.
2	147.0	...	S S W & S by W	...	86.4	B to 1 A. M., ~i to 7 P. M. B to 11 P. M.
3	148.8	0.02	S by W, S S W & S	...	102.5	B to 4 A. M., ~i to 8 A. M., ~i to 6 P. M., ~i to 11 P. M. Sheet L from 7 to 11 P. M. Light R at 4½ P. M.
4	145.0	0.20	S, E S E & S S E	0.8	87.2	~i to 2 A. M. O to 7 A. M., ~i to 4 P. M. S to 11 P. M. Sheet L on N W at midnight T & L at 4½ A. M. Slight R from 4 to 6 A. M. at 2½ & 4 P. M.
5	149.8	...	...	...	61.2	O to 2 A. M. S to 5 A. M., ~i to 2 P. M. O to 5 P. M. S to 11 P. M. T between 1½ & 3 & at 4½ P. M. D at 2 & 3 P. M.
6	145.0	1.77	...	...	49.1	~i to 4 A. M. ~i to 10 A. M., ~i to 1 P. M. O to 9 P. M. B to 11 P. M. T & L from 1 to 3½ P. M. R at 9½, 12½ A. M. & from 2½ to 6½ P. M.
7	140.0	0.15	...	...	61.4	S to 5 A. M., ~i to 8 A. M., ~i to 3 P. M. O to 8 P. M. S to 11 P. M. Sheet L on N W from Midnight to 2 A. M. Slight R at 2½ A. M. & from 3½ to 5½ P. M.
8	148.0	0.60	...	...	100.2	S to 3 A. M., ~i to 6 A. M. O to 9 A. M., ~i to 2 P. M. O to 8 P. M. S to 11 P. M. T from 1½ to 5 P. M. R from 3½ to 6 P. M.
9	...	0.39	S S E	...	109.3	S to 4 A. M. O to 11 P. M. T at 5½ A. M. & 1 P. M. Slight R from 3 A. M. to 4 P. M.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
~i Cirro, cumuli-B clear, S strati, O overcast, T thunder, L lightning,
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
the in month of September 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	^o	Inches		lb	Miles.	
10	122.0	1.81	S S E & S E	...	128.8	O to 4 A. M. S to 7 A. M., $\nearrow$ i to 11 A. M. O to 11 P. M. T at 11½ A. M. & 1½ P. M. R at 2½, 9½ & from 11½ A. M. to 6 P. M.
11	...	0.06	S by E	...	93.2	O to 4 A. M., $\nearrow$ i to 6 A. M. O to 5 P. M., $\nearrow$ i to 7 P. M. O to 11 P. M. Light R at 3, 5½, 7, 8 A. M. 1, 2, & 3 P. M.
12	102.0	0.13	S by E & S	...	114.0	O to 6 A. M., $\nearrow$ i O to 10 A. M. to 4 P. M., $\nearrow$ i & $\nearrow$ i to 11 P. M. Slight R from 3½ to 5 A. M. & at 2 & 5 P. M.
13	142.0	1.35	S S E & S	1.4	129.9	S to 11 A. M. O to 3 P. M., $\nearrow$ i to 6 P. M. S to 8 P. M. B to 11 P. M. Sheet L from 6½ to 8 P. M. R at 7½, 12½ A. M. 1½ & 8½ P. M.
14	146.8	...	S & S S W	...	148.7	B to 4 A. M., $\nearrow$ i to 7 A. M., $\nearrow$ i to 1 P. M. S to 11 P. M. Sheet L from 6½ to 7½ P. M.
15	145.0	...	S W & S by W	...	114.4	$\nearrow$ i & $\nearrow$ i to 10 A. M., $\nearrow$ i to 3 P. M. S to 6 P. M. O to 11 P. M. Sheet L on N E at 10½ P. M.
16	126.5	...	S by W & S by E	...	130.5	O to 5 A. M., $\nearrow$ i to 9 A. M. $\nearrow$ i to 11 A. M. O to 3 P. M. S to 11 P. M. T at 2½ P. M.
17	146.7	...	S by E & S	...	108.8	B to 4 A. M., $\nearrow$ i to 7 A. M., $\nearrow$ i to 5 P. M., $\nearrow$ i to 9 P. M., B to 11 P. M. Sheet L on N from 7 to 10 P. M.
18	147.9	...	S by E & S	...	124.7	B to 6 A. M., $\nearrow$ i & $\nearrow$ i to 4 P. M. S to 7 P. M., $\nearrow$ i to 11 P. M.
19	143.5	...	S by E & S	...	127.5	B to 4 A. M., $\nearrow$ i & $\nearrow$ i to 7 P. M. $\nearrow$ i to 11 P. M. Sheet L on N W at 7 P. M.
20	147.3	...	S & S S E	...	91.8	$\nearrow$ i to 8 A. M., $\nearrow$ i to 5 P. M., $\nearrow$ i to 11 P. M. D at 2 P. M.

$\nearrow$ i Cirri, — i Strati, $\nearrow$ i Cumuli, $\nearrow$ i Cirro-strati, $\nearrow$ i Cumulo-strati, $\nearrow$ i Nimbi, $\nearrow$ i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles	
21	143.2	...	S	...	72.0	B to 5 A. M., $\searrow$ to 7 A. M., $\searrow$ to 7 P. M., $\searrow$ to 11 P. M. D at 5 P. M.
22	145.8	...	S, S E & S S E	...	76.5	$\searrow$ to 2 A. M. B to 5 A. M., $\searrow$ to 7 A. M., $\searrow$ to 11 P. M. Sheet L on W at 8 P. M. T & L at 10½ P. M.
23	142.0	2.14	S S E & S by E	3.1	88.7	$\searrow$ & $\searrow$ to 2 P. M., O to 8 P. M. S to 11 P. M. T at 3, 4½ & 5 P. M. L from 7 to 9 P. M. R from 2 to 6½ P. M.
24	136.8	0.59	S E	0.7	161.4	Chiefly O. R after intervals.
25	...	0.24	E S E, S S E & S E	...	161.6	O. R after intervals.
26	...	0.41	S S E & S by E	...	163.8	O to 6 P. M. $\searrow$ & $\searrow$ to 11 P. M. T & L from Midnight to 3 A. M., & at 10 P. M. Slight R from Midnight to 2 P. M.
27	141.0	...	S S E, S by E & S	...	98.7	$\searrow$ to 8 A. M., $\searrow$ to 4 P. M. $\searrow$ to 11 P. M. D at 1 P. M.
28	131.0	0.04	S by E & S by W	...	109.4	$\searrow$ to 8 A. M., $\searrow$ to 11 P. M. L on W at 7 & 8 P. M. Light R at 10 A. M.
29	137.5	0.06	S by W & S	...	75.9	$\searrow$ to 3 A. M., $\searrow$ to 7 A. M., $\searrow$ to 4 P. M., $\searrow$ to 9 P. M., S to 11 P. M. Sheet L from 6½ to 9 P. M. Light R at 9½ A. M. & 10 P. M.
30	129.7	2.68	S & S by E	2.0	54.0	$\searrow$ to 4 A. M., O to 10 A. M., $\searrow$ & $\searrow$ to 4 P. M., O to 9 P. M., $\searrow$ to 11 P. M. Brisk wind from 1½ to 5 P. M. T & L from 5 to 9 P. M. R from 5 to 8 A. M. & 4½ to 9 P. M.

$\searrow$ Cirri — i Strati, $\searrow$ i Cumuli, $\searrow$ i Cirro-strati, $\searrow$ i Cumulo-strati $\searrow$ i Nimbi, $\searrow$ i Cirro-Cumuli. B clear, S stratoni, O overcast, T thunder, L lightning R rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of September 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.709
Max. height of the Barometer occurred at 9 A. M. on the 11th ...	29.869
Min. height of the Barometer occurred at 3 & 4 P. M. on the 23rd ...	29.517
Extreme range of the Barometer during the month ...	0.352
Mean of the daily Max. Pressures	29.766
Ditto ditto Min. ditto	29.642
Mean daily range of the Barometer during the month ...	0.124

	°
Mean Dry Bulb Thermometer for the month	82.9
Max. Temperature occurred at 3 P. M. on the 22nd ...	93.7
Min. Temperature occurred at 8 A. M. on the 11th ...	75.5
Extreme range of the Temperature during the month ...	18.2
Mean of the daily Max. Temperature	88.0
Ditto ditto Min. ditto,	79.5
Mean daily range of the Temperature during the month ...	8.5

Mean Wet Bulb Thermometer for the month	80.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.9
Computed Mean Dew-point for the month	78.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	4.9

	Inches.
Mean Elastic force of Vapour for the month	0.940

	Troy grain.
Mean Weight of Vapour for the month	10.09
Additional Weight of Vapour required for complete saturation ...	1.70
Mean degree of humidity for the month, complete saturation being unity	0.86

	°
Mean Max. Solar radiation Thermometer for the month	140.3

	Inches.
Rained 22 days.—Max. fall of rain during 24 hours	2.68
Total amount of rain during the month	12.67
Total amount of rain indicated by the Gauge* attached to the anemo- meter during the month	11.34
Prevailing direction of the Wind ... S. S. by E & S. S. E.	

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Sept. 1874.
MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on. N. by E.	Rain on. N. N. E.	Rain on. N. E.	Rain on. E. N. E.	Rain on. E. by N.	Rain on. E.	Rain on. E. by S.	Rain on. E. S. E.	Rain on. S. E.	Rain on. S. S. E.	Rain on. S. by E.	Rain on. S.	Rain on. S. by W.	Rain on. S. S. W.	Rain on. S. W.	Rain on. W. S. W.	Rain on. W. by S.	Rain on. W.	Rain on. W. by N.	Rain on. W. N. W.	Rain on. N. W.	Rain on. N. N. W.	Rain on. N. by W.	Rain on.
Midnight.																									
1										3	1	3	7	5	4	12	1								
2										3	1	3	7	5	4	1	1								
3										1	1	4	6	6	4	1	1								
4										1	1	5	12	7	4	1	1								
5			1	1				1	1	1	1	5	1	5	1	1	1								
6					1	1		1	1	1	3	5	1	5	1	1	1								
7						1				1	1	4	1	4	1	1	1								
8										1	1	4	1	4	1	1	1								
9										1	1	5	5	5	1	3	3								
10										1	1	3	12	1	3	5	1								
11								1		1	1	12	7	3	5	1	1								
Noon.		1								1	4	5	6	1	5	5	1								
1										1	4	5	3	3	3	3	1								
2			1							1	1	4	1	6	1	1	1								
3	1	1								1	1	3	1	5	1	5	1								
4			1	1						1	1	10	5	1	1	1	1								
5						1				1	1	6	3	3	1	1	1								
6										1	3	3	3	1	1	1	1								
7										1	3	3	3	1	1	1	1								
8										1	3	3	3	1	1	1	1								
9										1	3	3	3	1	1	1	1								
10										1	3	3	3	1	1	1	1								
11										1	3	3	3	1	1	1	1								

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.660	29.719	29.603	0.116	81.0	90.0	79.5	10.5
2	.685	.734	.638	.096	81.7	85.6	79.5	6.1
3	.674	.739	.597	.142	81.9	88.0	78.7	9.3
4	.698	.764	.645	.119	81.6	87.3	77.0	10.3
5	.761	.809	.708	.101	82.2	89.0	78.0	11.0
6	.783	.835	.733	.102	82.3	88.0	78.0	10.0
7	.780	.840	.700	.140	83.4	90.0	79.0	11.0
8	.785	.851	.724	.127	82.9	88.3	79.6	8.7
9	.793	.858	.711	.147	83.7	90.0	79.5	10.5
10	.816	.883	.761	.122	83.7	90.0	80.0	10.0
11	.801	.888	.732	.156	83.8	90.8	80.5	10.3
12	.760	.824	.697	.127	84.0	91.0	80.0	11.0
13	.764	.831	.705	.126	84.3	90.8	79.5	11.3
14	.768	.817	.730	.087	82.0	89.2	77.5	11.7
15	.669	.772	.534	.238	78.4	79.7	77.5	2.2
16	.648	.770	.486	.284	79.4	83.5	77.0	6.5
17	.798	.852	.741	.111	80.8	87.0	74.5	12.5
18	.841	.909	.785	.124	83.1	89.0	77.5	11.5
19	.853	.924	.807	.117	82.3	87.5	79.0	8.5
20	.838	.926	.763	.163	80.0	86.0	74.5	11.5
21	.809	.879	.747	.132	80.4	87.0	74.0	13.0
22	.805	.874	.741	.133	82.7	88.5	77.0	11.5
23	.822	.891	.774	.117	82.9	88.8	78.8	10.0
24	.863	.923	.806	.117	82.8	88.5	79.3	9.2
25	.867	.939	.822	.117	78.8	86.2	76.4	9.8
26	.832	.884	.788	.096	77.6	81.0	75.0	6.0
27	.847	.894	.813	.081	76.4	79.0	75.5	3.5
28	.838	.896	.790	.106	77.9	81.4	75.3	6.1
29	.827	.879	.774	.105	80.4	84.9	77.3	7.6
30	.854	.906	.797	.109	80.4	84.0	77.2	6.8
31	.921	.985	.874	.111	80.1	84.7	76.5	8.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	79.5	4.5	76.3	7.7	0.890	9.53	2.64	0.78
2	77.8	3.9	75.1	6.6	.857	.21	.16	.81
3	79.1	2.8	77.1	4.8	.913	.82	1.62	.86
4	77.8	3.8	75.1	6.5	.857	.21	2.13	.81
5	78.4	3.8	75.7	6.5	.873	.38	.16	.81
6	79.2	3.1	77.0	5.3	.910	.79	1.79	.85
7	79.3	4.1	76.4	7.0	.893	.58	2.38	.80
8	79.7	3.2	77.5	5.4	.925	.94	1.85	.84
9	80.1	3.6	77.6	6.1	.928	.95	2.12	.82
10	80.2	3.5	77.7	6.0	.931	.98	.09	.83
11	80.3	3.5	77.8	6.0	.934	10.01	.09	.83
12	80.1	3.9	77.4	6.6	.922	9.87	.30	.81
13	79.5	4.8	76.1	8.2	.885	.48	.80	.77
14	76.2	5.8	72.1	9.9	.778	8.36	3.11	.73
15	77.0	1.4	76.0	2.4	.882	9.56	0.75	.93
16	76.8	2.6	75.0	4.4	.854	.24	1.38	.87
17	77.3	3.5	74.8	6.0	.849	.15	.92	.83
18	79.0	4.1	76.1	7.0	.885	.50	2.36	.80
19	77.4	4.9	74.0	8.3	.827	8.90	.68	.77
20	73.5	6.5	68.9	11.1	.701	7.57	3.24	.70
21	75.2	5.2	71.6	8.8	.766	8.25	2.69	.75
22	77.6	5.1	74.0	8.7	.827	.88	.84	.76
23	78.7	4.2	75.8	7.1	.876	9.41	.38	.80
24	78.7	4.1	75.8	7.0	.876	.41	.34	.80
25	76.4	2.4	74.7	4.1	.846	.16	1.28	.88
26	75.6	2.0	74.2	3.4	.832	.04	.03	.90
27	75.4	1.0	74.7	1.7	.846	.19	0.53	.95
28	76.9	1.0	76.2	1.7	.887	.62	.54	.95
29	78.1	2.3	76.5	3.9	.896	.67	1.27	.88
30	77.7	2.7	75.8	4.6	.876	4.4	.50	.86
31	76.0	4.1	73.1	7.0	.803	8.67	2.17	.80

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.787	29.887	29.530	0.357	79.4	82.0	76.0	6.0
1	.777	.844	.507	.377	79.1	81.9	75.6	6.3
2	.769	.874	.486	.388	78.8	81.8	75.4	6.4
3	.760	.877	.493	.384	78.5	81.6	75.0	6.6
4	.763	.882	.519	.363	78.3	81.4	74.7	6.7
5	.777	.895	.533	.362	78.0	81.2	74.3	6.9
6	.793	.908	.581	.327	77.9	81.0	74.0	7.0
7	.814	.938	.611	.327	78.4	81.5	75.1	6.4
8	.836	.968	.659	.309	80.3	83.3	75.5	7.8
9	.849	.985	.691	.294	82.2	86.0	75.8	10.2
10	.849	.983	.704	.279	83.8	87.0	77.0	10.0
11	.835	.967	.705	.262	84.9	88.5	77.7	10.8
Noon.	.810	.942	.681	.261	85.6	90.6	77.5	13.1
1	.783	.920	.645	.275	85.7	91.0	77.5	13.5
2	.759	.887	.623	.264	85.9	90.8	77.5	13.3
3	.744	.879	.603	.276	85.8	90.5	77.6	12.9
4	.739	.878	.597	.281	84.8	90.0	77.0	13.0
5	.747	.894	.603	.291	83.7	90.0	75.5	14.5
6	.755	.901	.570	.331	82.0	86.5	75.5	11.0
7	.773	.926	.568	.358	81.3	85.2	75.5	9.7
8	.795	.952	.578	.374	80.8	84.0	75.7	8.3
9	.807	.958	.540	.418	80.5	83.5	75.8	7.7
10	.811	.964	.534	.430	80.0	82.6	76.0	6.6
11	.808	.955	.538	.417	79.6	82.0	76.0	6.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	77.6	1.8	76.3	3.1	0.890	9.63	0.99	0.91
1	77.4	1.7	76.2	2.9	.887	.60	.93	.91
2	77.2	1.6	76.1	2.7	.885	.57	.87	.92
3	77.0	1.5	75.9	2.6	.879	.51	.84	.92
4	76.8	1.5	75.7	2.6	.873	.45	.83	.92
5	76.7	1.3	75.8	2.2	.876	.50	.69	.93
6	76.5	1.4	75.5	2.1	.868	.42	.74	.93
7	76.9	1.5	75.8	2.6	.876	.48	.83	.92
8	77.7	2.6	75.9	4.4	.879	.49	1.42	.87
9	78.2	4.0	75.4	6.8	.865	.39	2.24	.81
10	78.7	5.1	75.1	8.7	.857	.17	.93	.76
11	79.0	5.9	74.9	10.0	.851	.09	3.40	.73
Noon.	79.2	6.4	74.7	10.9	.846	.03	.73	.71
1	78.9	6.8	74.1	11.6	.830	8.85	.95	.69
2	78.9	7.0	74.0	11.9	.827	.82	4.05	.69
3	78.8	7.0	73.9	11.9	.824	.79	.91	.69
4	78.2	6.6	73.6	11.2	.817	.73	37.3	.70
5	78.1	5.6	74.2	9.5	.832	.91	.16	.74
6	77.9	4.1	75.0	7.0	.854	9.18	2.29	.80
7	77.9	3.4	75.5	5.8	.868	.35	1.89	.83
8	78.0	2.8	76.0	4.8	.882	.50	.57	.86
9	78.0	2.5	76.2	4.3	.887	.58	.40	.87
10	77.9	2.1	76.4	3.6	.893	.64	.17	.89
11	77.7	1.9	76.4	3.2	.893	.66	.03	.90

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	<i>°</i>	Inches		lb	Mile.	
1	140.0	...	S by E & N W	...	47.9	↘i to 8 A. M., ↘i to 4 P. M. B to 11 P. M.
2	114.0	0.02	NW, NNW & N N	...	108.0	↘i to 5 A. M. S to 1 P. M. O to 11 P. M. Light R at 3 & 7 P. M.
3	118.0	0.12	N N E & E	0.8	138.1	↘i to 4 A. M. S to 8 A. M., ↘i to 7 P. M. O to 11 P. M. Sheet L at Midnight 1 A. M. & 8 P. M. Light R at 5½, 7 A. M. 1, 2½, 5, 8 & 10 P. M.
4	140.0	0.08	S S E & S by E	2.0	30.0	O to 5 A. M., ↘i to 11 P. M. Brisk wind between 1 & 2 A. M. Light R at 1½ & 10½ A. M.
5	143.4	...	S E & S S E	0.7	114.0	B to 2 A. M., ↘i to 6 P. M. B to 11 P. M.
6	128.5	0.21	S S E & E S E	...	125.1	B to 6 A. M., ↘i to 8 P. M. B to 11 P. M. T from 12½ to 2 P. M. R at 12½ A. M.
7	147.2	1.03	E S E, S E & S S E	...	81.9	B to 4 A. M., ↘i to 7 A. M., ↘i to 5 P. M. O to 11 P. M. L from 6 to 10 P. M. T & R from 6 to 8 P. M.
8	139.0	0.17	S S E, S E & S by E	...	54.0	S to 4 A. M., ↘i to 9 A. M., ↘i to 3 P. M. O to 6 P. M., ↘i to 11 P. M. Slightly foggy from 5 to 7 A. M. R between 4 & 5 P. M.
9	138.9	0.02	S by E & S S E	...	61.9	B to 5 A. M., ↘i to 9 P. M. B to 11 P. M. L on N at 7 & 8 P. M. Light R at 5 P. M.
10	148.7	...	S S E	...	55.6	B to 5 A. M., ↘i to 7 A. M., ↘i to 8 P. M., ↘i to 11 P. M. Sheet L at 3 A. M. & from 7 to 9 P. M. D at 4½ P. M.
11	144.5	0.06	S S E & N N E	...	46.5	B to 4 A. M., ↘i to 7 A. M., ↘i to 6 P. M. B to 11 P. M. T at 3 P. M. Sheet L at 7 & 11 P. M. Light R at 3½ P. M.

↘i Cirri. —i Strati, ↘i Cumuli, ↘i Cirro-strati, ↘i Cumulo-strati, ↘i Nimbi, ↘i Cirro, cumuli-B clear, S stratoni, O overcast, T thunder, L lightning, R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
the in month of October 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches	[by S	lb	Mic s.	
12	143.0	0.19	NNE, E by N & E	4.0	67.3	B to 5 A. M., \i to 7 A. M., \i to 7 P. M. B to 11 P. M. Strong wind from 4½ to 5 P. M. Slightly foggy at 4 & 5 A. M. Sheet Lon N W from midnight to 3 A. M. T & L from 4 to 7 P. M. R at 3 & 5 P. M.
13	140.5	...	E by S & E	...	102.7	B to 4 A. M. O to 7 A. M. B to 10 A. M., \i to 5 P. M., \i to 7 P. M. B to 11 P. M. Foggy at 5 & 6 A. M.
14	139.0	...	E & S E	0.8	177.8	\i to 11 A. M. S to 11 P. M.
15	...	1.27	NE, ENE & E	12.0	198.1	O. Gale from 5 to 11 P. M. T between 11 & 12 A. M. R nearly the whole day.
16	126.0	*4.56	S, S W & W S W	8.0	584.6	O to 10 A. M. S to 7 P. M. B to 11 P. M. Gale from midnight to 5½ A. M. Brisk wind from 5½ to 10 A. M. R from midnight to 9 A. M.
17	137.5	...	W S W & S	...	110.5	B to 5 A. M. \i to 11 A. M. \i to 4 P. M. B to 11 P. M. Slightly foggy from 8 to 11 P. M.
18	146.2	...	W S W & W by S	...	45.9	B to 9 A. M., \i to 6 P. M. B to 11 P. M. Slightly foggy from midnight to 4 A. M. & 7 to 10 P. M.
19	136.2	...	[NNW W by S, N W &	...	56.0	B to 2 A. M., \i to 5 P. M. B to 11 P. M. D at 7½ A. M.
20	135.0	...	NNW & N W	...	101.9	B. Slightly foggy from 9 to 11 P. M.
21	139.0	...	NW & N by W	...	84.1	B to 10 A. M., \i to 3 P. M. \i to 5 P. M. B to 11 P. M.
22	138.7	...	N by W	...	42.1	B to 7 A. M., \i to 9 A. M. \i to 5 P. M. B to 11 P. M. Slightly foggy from 2 to 4 A. M.
23	133.0	...	NE & N by E	...	46.9	B to 8 A. M., \i to 5 P. M. B to 11 P. M. Slightly foggy from 7 to 11 P. M.

\i Cirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning
R. rain, D. drizzle.

* Fell after 4 P. M. of the 15th to 9 A. M. of the 16th.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1874.*

Solar Radiation, Weather, &c.,

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
24	143.0	...	NN E, N & S E	1.6	16.8	∩i to 3 A. M. B to 8 A. M., ∩i to 8 P. M. B to 11 P. M. Slightly foggy from midnight to 9 A. M.
25	120.0	1.60	S E & S S E	...	115.2	B to 6 A. M., ∩i to 12 A. M. O to 9 P. M. S to 11 P. M. R from 12½ A. M. to 5 P. M.
26	...	...	S S E & E S E	...	150.1	S to 3 A. M. O to 9 A. M. S to 2 P. M. O to 11 P. M. D at 9 A. M. 3, 5½, 6, 7, 9, 10 & 11 P. M.
27	...	1.39	E S E & E	...	121.0	O. R near ly the whole day.
28	...	2.56	S E & S	2.0	135.7	O to 5 P. M. ∩i to 8 P. M., ∩i to 11 P. M. R from 2 to 11. A. M.
29	133.0	0.43	S E & S by E	...	162.8	∩i to 8 A. M., ∩i to 6 P. M. B to 11 P. M. T at 11½ & 12½ A. M. Sheet L on N W at 8 P. M. R from 10½ to 12 A. M. & at 3 P. M.
30	137.5	...	S by E, S, & W	...	125.1	B to 5 A. M., ∩i to 3 P. M., ∩i to 5 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M. D at 8½ A. M.
31	131.0	...	W & N N W	...	81.1	B to 1 A. M. ∩i to 5 A. M. B to 8 A. M., ∩i to 3 P. M. ∩i to 7 P. M. B to 11 P. M. Slightly foggy at midnight.

∩i Cirri —i Strati, ∩i Cumuli, ∩i Cirro-strati, ∩i Cumulo-strati ∩i Nimbi, ∩i Cirro-Cumuli. B clear, S stratoni, O overcast, T thunder, L lightning R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of October 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ...	29.789
Max. height of the Barometer occurred at 9 A. M. on the 31st ...	29.985
Min. height of the Barometer occurred at 2 A. M. on the 16th ...	29.486
Extreme range of the Barometer during the month ...	0.499
Mean of the daily Max. Pressures ...	29.855
Ditto ditto Min. ditto ...	29.727
Mean daily range of the Barometer during the month ...	0.128

	°
Mean Dry Bulb Thermometer for the month ...	81.5
Max. Temperature occurred at 1 P. M. on the 12th ...	91.0
Min. Temperature occurred at 6 A. M. on the 21st ...	74.0
Extreme range of the Temperature during the month ...	17.0
Mean of the daily Max. Temperature ...	86.9
Ditto ditto Min. ditto ...	77.7
Mean daily range of the Temperature during the month ...	9.2

Mean Wet Bulb Thermometer for the month ...	77.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	3.6
Computed Mean Dew-point for the month ...	75.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	6.1

	Inches.
Mean Elastic force of Vapour for the month ...	0.865

	Troy grain.
Mean Weight of Vapour for the month ...	9.32
Additional Weight of Vapour required for complete saturation ...	1.99
Mean degree of humidity for the month, complete saturation being unity ...	0.82

	°
Mean Max. Solar radiation Thermometer for the month ...	130.3

	Inches.
Rained 19 days.—Max. fall of rain during 24 hours ...	4.56
Total amount of rain during the month ...	13.71
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ...	12.24
Prevailing direction of the Wind ... S. S. E. & S. E.	

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Oct. 1874.

MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on. N. by E.	Rain on. N. N. E.	N. E.	Rain on. E. N. E.	Rain on. E. by N.	E.	Rain on. E. by S.	Rain on. E. S. E.	S. E.	Rain on. S. S. E.	Rain on. S. by E.	S.	Rain on. S. by W.	Rain on. S. S. W.	Rain on. W. by S.	W.	Rain on. W. by N.	Rain on. W. N. W.	N. W.	Rain on. N. N. W.	Rain on. N. by W.
Midnight		1	1	2			1	1	3	1	5	5	3	1	1					2	1	1
1		1	1	2			1	1	4	1	5	5	3	1	1					2	1	1
2		1	1	2			1	1	3	1	4	1	1	1	1					2	1	1
3		1	1	2			1	1	1	1	4	1	1	1	1					2	1	1
4			2	2			1	1	1	1	4	1	1	1	1					2	1	1
5			2	2			1	1	1	1	4	1	1	1	1					2	1	1
6			2	2			1	1	1	1	4	1	1	1	1					2	1	1
7	1		2	2	1	1	1	1	1	1	4	1	1	1	1					2	1	1
8	2	1			1	1	1	1	1	1	4	1	1	1	1					2	1	1
9	3		1		1	1	1	1	1	1	4	1	1	1	1					2	1	1
10	1	1			1	1	1	1	1	1	4	1	1	1	1					2	1	1
11	2				4	1	4	1	1	4	6	3	3	1	1					2	1	1
Noon.	1	2		1	1	6	4	1		4	5	1	1	1						1	1	1
1	1	1	1		1	4	2	1	1	1	4	4	1	2						2	1	1
2		1	1				2	1	1	1	4	4	1	1						2	1	1
3	2	1	1				2	1	1	1	4	4	1	1						2	1	1
4	2		1				2	1	1	1	4	4	1	1						2	1	1
5			2		1	1	2	1	1	1	4	4	1	1						2	1	1
6			2				2	1	1	1	4	4	1	1						2	1	1
7			1	1	1		2	1	1	1	4	4	1	1						2	1	1
8			1	1	1	1	2	1	1	1	4	4	1	1						2	1	1
9			1	1	1	1	2	1	1	1	4	4	1	1						2	1	1
10			1	1	1	1	2	1	1	1	4	4	1	1						2	1	1
11			1				1	1	1	1	4	4	1	1						2	1	1

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1874.*

Latitude $22^{\circ} 33' 1''$ North. Longitude $88^{\circ} 20' 34''$ East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Faint.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.944	29.998	29.901	0.097	80.9	85.6	77.0	8.6
2	.942	30.003	.888	.115	80.8	84.7	77.7	7.0
3	.952	.021	.904	.117	79.9	84.6	77.4	7.2
4	.971	.032	.923	.109	79.9	85.8	76.4	9.4
5	.973	.048	.923	.125	81.2	87.3	76.9	10.4
6	.918	.029	.881	.148	80.3	86.3	76.5	9.8
7	.931	.006	.872	.124	77.6	83.3	73.0	10.3
8	.934	29.999	.874	.125	75.8	83.0	69.5	13.5
9	.941	.992	.884	.108	77.9	84.7	72.0	12.7
10	.945	30.012	.881	.131	78.8	84.3	73.7	10.6
11	.943	.010	.882	.128	77.7	81.7	74.5	7.2
12	.941	.008	.899	.109	77.1	81.0	74.5	6.5
13	.958	.019	.910	.109	76.8	81.5	73.4	8.1
14	.985	.054	.929	.125	77.8	84.8	72.0	12.8
15	.995	.059	.951	.108	76.9	84.2	71.0	13.2
16	30.015	.078	.961	.117	75.2	81.7	69.8	11.9
17	.032	.062	.981	.111	76.0	83.4	70.0	13.4
18	.010	.076	.957	.119	75.9	81.5	71.7	9.8
19	29.988	.058	.942	.116	74.2	80.6	68.0	12.6
20	.996	.078	.931	.147	73.0	80.0	67.0	13.0
21	.995	.062	.949	.113	71.8	79.3	66.0	13.3
22	.988	.045	.937	.108	69.4	76.7	63.6	13.1
23	.992	.060	.931	.129	68.9	77.0	61.5	15.5
24	.989	.055	.939	.116	69.0	77.1	61.5	15.6
25	30.025	.096	.975	.121	69.6	77.9	63.0	14.9
26	.056	.130	30.009	.121	69.9	77.8	63.0	14.8
27	.039	.112	29.985	.127	69.2	78.4	62.0	16.4
28	.010	.005	.956	.139	68.7	77.7	61.5	16.2
29	.005	.069	.957	.112	69.0	78.2	61.4	16.8
30	.027	.102	.971	.131	69.1	78.2	61.3	16.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity:
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	77.4	3.5	74.9	6.0	.0851	9.17	1.93	.083
2	78.1	2.7	76.2	4.6	.887	.56	.51	.86
3	77.1	2.8	75.1	4.8	.857	.25	.53	.86
4	77.1	2.8	75.1	4.8	.857	.25	.53	.86
5	76.5	4.7	73.2	8.0	.806	8.68	2.53	.77
6	74.4	5.9	70.3	10.0	.734	7.92	.99	.73
7	71.3	6.3	66.9	10.7	.657	.12	.95	.71
8	68.8	7.0	63.9	11.9	.595	6.47	3.07	.68
9	70.9	7.9	66.0	11.9	.638	.91	.25	.68
10	74.2	4.6	71.0	7.8	.751	8.12	2.32	.78
11	75.2	2.5	73.4	4.3	.811	.80	1.30	.87
12	71.2	5.9	67.1	10.0	.661	7.17	2.75	.72
13	72.6	4.2	69.7	7.1	.720	.82	.01	.80
14	72.8	5.0	69.3	8.5	.711	.69	.44	.76
15	70.4	6.5	65.8	11.1	.634	6.89	.97	.70
16	68.2	7.0	63.3	11.9	.584	.35	3.02	.68
17	69.5	6.5	64.9	11.1	.615	.70	2.90	.70
18	69.6	6.3	65.2	10.7	.621	.67	.81	.71
19	67.3	6.9	62.5	11.7	.568	.20	.89	.68
20	66.7	6.3	61.7	11.3	.554	.95	.71	.69
21	65.2	6.6	59.9	11.9	.521	5.71	.74	.68
22	62.6	6.8	57.2	12.2	.476	.24	.62	.67
23	62.6	6.3	57.6	11.3	.483	.32	.42	.69
24	62.9	6.1	58.0	11.0	.489	.39	.37	.70
25	63.8	5.8	59.2	10.4	.509	.62	.28	.71
26	63.3	6.6	58.0	11.9	.489	.38	.60	.67
27	62.4	6.8	57.0	12.2	.473	.31	.60	.67
28	62.4	6.3	57.4	11.3	.480	.29	.40	.69
29	63.2	5.8	58.6	10.4	.499	.51	.25	.71
30	62.6	6.5	57.4	11.7	.480	.28	.50	.68

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surgeon General's Office, Calcutta,
in the month of November 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.983	30.056	29.921	0.135	72.2	79.2	64.5	14.7
1	.974	.047	.912	.135	71.7	79.6	64.0	15.0
2	.966	.043	.899	.144	71.2	78.7	63.5	15.2
3	.958	.037	.903	.134	70.7	78.4	63.0	15.4
4	.958	.035	.908	.127	70.3	78.2	62.4	15.8
5	.971	.051	.922	.129	70.0	78.0	62.0	16.0
6	.989	.065	.937	.128	69.6	77.7	61.4	16.3
7	30.000	.086	.960	.126	69.9	77.9	61.3	16.6
8	.030	.110	.975	.135	72.3	80.5	63.2	17.3
9	.049	.130	.992	.138	75.4	83.0	66.8	16.2
10	.046	.117	.992	.125	77.6	84.0	70.2	13.8
11	.027	.106	.967	.139	79.2	85.8	73.5	12.3
Noon.	29.999	.078	.945	.133	80.2	86.6	75.0	11.6
1	.968	.047	.914	.133	80.9	87.3	75.6	11.7
2	.945	.019	.893	.126	81.2	85.8	76.7	9.1
3	.933	.009	.874	.135	81.1	87.3	75.8	11.5
4	.932	.010	.872	.138	80.0	86.0	75.3	10.7
5	.940	.019	.873	.146	78.6	84.5	73.0	11.5
6	.952	.028	.890	.138	76.8	82.8	71.0	11.8
7	.970	.046	.906	.140	75.4	81.5	69.5	12.0
8	.986	.061	.912	.149	74.5	81.0	68.0	13.0
9	.997	.059	.925	.134	73.8	80.3	67.2	13.1
10	30.001	.078	.927	.151	73.1	79.6	66.0	13.6
11	29.996	.071	.926	.145	72.4	79.2	65.3	13.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	69.2	3.0	66.8	5.4	.655	7.19	1.36	0.84
1	68.7	3.0	66.3	5.4	.644	.08	.35	.84
2	68.2	3.0	65.8	5.4	.634	6.97	.33	.84
3	67.8	2.9	65.5	5.2	.628	.91	.27	.85
4	67.5	2.8	65.3	5.0	.623	.86	.22	.85
5	67.1	2.9	64.8	5.2	.613	.76	.24	.85
6	66.9	2.7	64.7	4.9	.611	.73	.17	.85
7	67.0	2.9	64.7	5.2	.611	.73	.25	.84
8	68.0	4.3	64.6	7.7	.609	.67	.91	.78
9	69.1	6.3	64.7	10.7	.611	.65	2.78	.71
10	69.9	7.7	64.5	13.1	.607	.58	3.49	.65
11	70.5	8.7	64.4	14.8	.605	.54	4.02	.62
Noon.	70.4	9.8	63.5	16.7	.588	.33	.55	.58
1	70.8	10.1	63.7	17.2	.591	.37	.73	.57
2	71.0	10.2	63.9	17.3	.595	.40	.81	.57
3	70.8	10.3	63.6	17.5	.590	.33	.84	.57
4	70.4	9.6	63.7	16.3	.591	.38	.43	.59
5	70.5	8.1	64.8	13.8	.613	.64	3.74	.64
6	71.0	5.8	66.9	9.9	.657	7.13	2.70	.73
7	70.7	4.7	67.4	8.0	.668	.27	.16	.77
8	70.2	4.3	67.2	7.3	.664	.25	1.93	.79
9	69.9	3.9	67.2	6.6	.664	.25	.73	.81
10	69.5	3.6	66.6	6.5	.651	.11	.68	.81
11	69.1	3.3	66.5	5.9	.648	.10	.50	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<i>o</i>	Inches		lb	Mile.	
1	130.8	...	N N W, E by N & [E S E	...	92.1	~i to 6 A.M., ~i to 10 A.M., ~i to 4 P.M. S to 8 P.M. B to 11 P.M. Sheet L on S between 5 & 6 P.M.
2	125.0	...	E S E & E	...	70.7	~i to 2 A.M. S to 6 P.M., ~i to 11 P.M.
3	141.8	...	E & S E	...	32.3	~i to 4 A.M., ~i to 8 A.M., ~i to Noon, O to 5 P.M. S to 8 P.M. B to 11 P.M. T & D at 1 P.M.
4	134.5	0.06	S E & E S E	...	45.4	B to 3 A.M., ~i to 9 A.M., ~i to 4 P.M., ~i to 6 P.M. B to 11 P.M. Slightly foggy from 7 to 11 P.M. Light R at 2 P.M.
5	134.5	...	E S E & E by N	...	83.7	B to 2 A.M., ~i to 5 A.M., ~i to 10 A.M., ~i to 5 P.M. B to 11 P.M. Slightly foggy from midnight to 2 A.M.
6	133.0	...	E by N	...	132.2	B to 3 A.M., ~i to 1 P.M. ~i to 4 P.M. B to 11 P.M.
7	130.0	...	E by N & N E	...	108.9	B to 3 A.M., ~i to 6 P.M. B to 11 P.M. Slightly foggy from midnight to 3 A.M.
8	133.7	...	N E & E N E	...	120.9	B to 5 A.M., ~i to 8 A.M. B to 11 A.M., ~i to 5 P.M. B to 11 P.M.
9	132.0	...	E N E & E by N [E by S	...	195.1	B to 1 A.M. S to 5 A.M., ~i to 7 P.M. O to 11 P.M.
10	133.0	...	E N E, E by N &	...	187.5	O to 7 A.M., ~i & ~i to 11 A.M., ~i to 6 P.M., ~i to 11 P.M. D at 3½ P.M.
11	119.0	0.06	E by S & E	...	120.0	~i to 2 A.M. S to 7 A.M., ~i to 11 A.M. O to 11 P.M. Light R at 12½ & 5½ P.M.
12	116.0	...	E & by E by N	...	175.5	Chiefly O. D at 3½ A.M.
13	127.0	...	E by N & E N E	...	202.2	O to Noon, ~i to 5 P.M. S to 9 P.M. B to 11 P.M. D at 4 A.M.
14	129.0	...	E N E	...	201.6	~i to 2 A.M. B to 11 A.M., ~i to 4 P.M., ~i to 9 P.M. B to 11 P.M.
15	130.5	...	E N E & N N W	...	227.2	B to 6 A.M., ~i to 9 A.M. B to Noon, ~i to 3 P.M. B to 11 P.M.

~i Cirri, —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi, ~i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning, R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
the in month of November 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
16	133.0	...	N by W	...	190.7	B to 4 A. M., \i to 4 P. M. B to 9 P. M., \i to 11 P. M.
17	133.0	...	N by W & N by E	...	104.2	B to 3 A. M., \i to 1 P. M. \i to 11 P. M.
18	129.5	...	NN E & WNW	...	73.9	\i to 6 A. M., \i to Noon, \i to 6 P. M., \i to 11 P. M.
19	129.0	...	WNW & N by W	...	36.2	\i to 4 A. M. B to 3 P. M., \i to 7 P. M. B to 11 P. M. Slightly foggy at 8 & 9 P. M.
20	134.0	...	N by W & N by E	...	59.7	B to 10 A. M., \i to 1 P. M., \i to 3 P. M. B to 11 P. M. Slightly foggy at 8 & 9 P. M.
21	125.5	...	N by E	...	50.3	Chiefly B.
22	126.5	...	N by E & N	...	63.2	B to 5 A. M., \i to 8 A. M. B to 11 A. M., \i to 6 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M.
23	128.2	...	N & N by E	...	59.1	B to 6 A. M., \i to 11 P. M. Foggy from midnight to 2 A. M. & 7 to 10 P. M.
24	124.5	...	N by E & NW	...	39.5	\i to 1 A. M. B to 11 A. M., \i to 11 P. M. Slightly foggy from 8 to 11 P. M.
25	123.0	...	NW & N by W	...	58.2	B to 4 A. M., \i to 11 P. M. Slightly foggy at midnight.
26	124.0	...	N by W & N	...	98.0	Chiefly \i.
27	127.0	...	N by W & NNW	...	71.2	\i to 2 A. M. B to 5 A. M., \i to 6 P. M. B to 11 P. M.
28	124.0	...	NNW & WNW	...	49.5	Chiefly \i
29	124.0	...	WNW & N by W	...	55.4	Chiefly B. Slightly foggy from 7 to 11 P. M.
30	128.8	...	NNW, N & N by W	...	24.8	B.

\i Cirri, —i Strati, —i Cumuli, \i Cirro-strati, ~i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of November 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	29.982
Max. height of the Barometer occurred at 9 A. M. on the 26th ...	30.130
Min. height of the Barometer occurred at 4 P. M. on the 7th ...	29.872
Extreme range of the Barometer during the month	0.258
Mean of the daily Max. Pressures	30.050
Ditto ditto Min. ditto	29.929
Mean daily range of the Barometer during the month	0.121

	°
Mean Dry Bulb Thermometer for the month	74.9
Max. Temperature occurred at 1 & 3 P. M. on the 5th	87.3
Min. Temperature occurred at 7 A. M. on the 30th	61.3
Extreme range of the Temperature during the month	26.0
Mean of the daily Max. Temperature	81.6
Ditto ditto Min. ditto,	69.6
Mean daily range of the Temperature during the month	12.0

Mean Wet Bulb Thermometer for the month	69.3
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.6
Computed Mean Dew-point for the month	65.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.5

	Inches.
Mean Elastic force of Vapour for the month	0.626

	Troy grain.
Mean Weight of Vapour for the month	6.81
Additional Weight of Vapour required for complete saturation ...	2.47
Mean degree of humidity for the month, complete saturation being unity	0.73

	°
Mean Max. Solar radiation Thermometer for the month	128.8

	Inches.
Rained 6 days,—Max. fall of rain during 24 hours	0.06
Total amount of rain during the month	0.12
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	0.06
Prevailing direction of the Wind ... N. by W. & E. by N.	

* Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Nov. 1874.
MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on. N. by E.	Rain on. N. N. E.	Rain on. N. E.	Rain on. E. N. E.	Rain on. E. by N.	Rain on. E.	Rain on. E. by S.	Rain on. E. S. E.	Rain on. S. E.	Rain on. S. S. E.	Rain on. S. by E.	S.	Rain on. S. by W.	Rain on. S. S. W.	Rain on. S. W.	Rain on. W. S. W.	Rain on. W. by S.	Rain on. W.	Rain on. W. by N.	Rain on. W. N. W.	Rain on. N. W.	Rain on. N. N. W.	Rain on. N. by W.	Rain on.			
Midnight	1	3	1	1	4	3	12	1	12	1	No. of days.														12	1	3	5
1	1	3	1	1	4	3	12	1	12	1																		
2	1	3	1	1	4	3	12	1	12	1																		
3	1	3	1	1	4	3	12	1	12	1																		
4	12	3	1	1	4	3	12	1	12	1																		
5	12	3	1	1	4	3	12	1	12	1																		
6	12	3	1	1	4	3	12	1	12	1																		
7	1	3	1	12	3	3	3	1	12																			
8	4	4	1	12	3	3	3	1	12																			
9	4	4	3	12	3	3	3	1	12																			
10	7	12	12	1	4	4	12	12	12																			
11	7	3	1	1	5	4	12	12	12																			
Noon.	3	1	1	1	4	6	3		1																			
1	4	2	1		3	7	12																					
2	4				3	7	12																					
3	4	1			3	7	12																					
4	5	1	1		12	6	4																					
5					3	4	4																					
6	1	4		1	4	4	12	1																				
7	1	4		1	4	3	1																					
8	1	4		1	4	3	1																					
9	1	4		1	4	3	1																					
10	1	4		1	4	3	1																					
11	1	3	1	1	4	3	12																					

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1874.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	30.039	30.110	29.984	0.126	68.9	78.3	61.8	16.5
2	.032	.112	.972	.140	68.4	77.5	61.5	16.0
3	.051	.128	30.001	.127	68.2	77.0	60.0	17.0
4	.063	.138	.010	.128	68.8	77.5	61.9	15.6
5	.058	.119	.005	.114	68.4	77.2	60.5	16.7
6	.069	.143	.020	.123	67.8	77.6	60.0	17.6
7	.072	.146	.022	.124	67.9	76.8	60.7	16.1
8	.072	.151	.020	.131	67.7	76.5	60.5	16.0
9	.047	.109	.007	.102	69.2	78.8	61.0	17.8
10	.049	.133	29.990	.143	70.5	78.3	63.8	14.5
11	.015	.122	.984	.138	69.9	77.9	64.6	13.3
12	.066	.149	30.009	.140	67.4	76.5	60.5	16.0
13	.057	.144	29.982	.162	68.2	76.8	60.2	16.6
14	.022	.098	.966	.132	69.1	78.0	61.0	17.0
15	.043	.111	30.003	.108	67.4	76.4	61.0	15.4
16	.068	.148	.018	.130	64.5	74.0	57.5	16.5
17	.069	.140	.016	.124	65.1	74.5	57.3	17.2
18	.052	.139	29.989	.150	65.5	74.5	58.5	16.0
19	.025	.086	.966	.120	64.2	73.5	56.4	17.1
20	.070	.155	30.022	.133	63.2	73.0	54.7	18.3
21	.050	.142	29.972	.170	62.4	72.3	53.9	18.4
22	.022	.102	.959	.143	61.9	71.0	54.2	16.8
23	.017	.095	.965	.130	63.6	71.7	55.5	19.2
24	.005	.082	.943	.139	65.1	76.0	56.3	19.7
25	29.949	.031	.882	.149	67.2	78.7	57.8	20.9
26	.928	29.990	.865	.125	68.6	79.0	61.0	18.0
27	.996	30.055	.959	.096	67.0	76.5	58.0	18.5
28	30.021	.088	.967	.121	67.7	76.0	61.0	15.0
29	.020	.104	.962	.142	68.3	78.2	59.5	18.7
30	.059	.132	.995	.137	68.7	79.3	60.5	18.8
31	.072	.157	30.019	.138	68.6	77.3	60.0	17.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1874.*

Daily Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	62.3	6.6	57.0	11.9	0.473	5.21	2.53	0.67
2	61.8	6.6	56.5	11.9	.465	.13	.49	.67
3	61.8	6.4	56.7	11.5	.469	.16	.42	.68
4	62.5	6.3	57.5	11.3	.481	.31	.40	.69
5	61.6	6.8	56.2	12.2	.461	.08	.54	.67
6	61.5	6.3	56.5	11.3	.465	.14	.34	.69
7	62.2	5.7	57.6	10.3	.483	.33	.18	.71
8	62.7	5.0	58.7	9.0	.501	.54	1.92	.74
9	63.5	5.7	58.9	10.3	.504	.56	2.25	.71
10	64.5	6.0	59.7	10.8	.518	.69	.44	.70
11	62.7	7.2	56.9	13.0	.472	.18	.80	.65
12	59.9	7.5	53.9	13.5	.426	4.71	.68	.64
13	61.6	6.6	56.3	11.9	.462	5.10	.48	.67
14	62.5	6.6	57.2	11.9	.476	.24	.54	.67
15	60.1	7.3	54.3	13.1	.432	4.78	.61	.65
16	57.5	7.0	51.9	12.6	.398	.43	.33	.66
17	58.8	6.3	53.8	11.3	.425	.72	.17	.69
18	59.0	6.5	53.8	11.7	.425	.71	.27	.68
19	56.1	8.1	48.8	15.4	.358	3.99	.70	.60
20	55.9	7.3	49.3	13.9	.365	4.06	.43	.63
21	55.6	6.8	49.5	12.9	.367	.10	.23	.65
22	55.9	6.0	50.5	11.4	.389	.25	1.98	.68
23	57.0	6.6	51.1	12.5	.388	.31	2.26	.66
24	58.8	6.3	53.8	11.3	.425	.72	.17	.69
25	60.7	6.5	55.5	11.7	.450	.98	.37	.68
26	62.9	5.7	58.3	10.3	.494	5.45	.22	.71
27	60.5	6.5	55.3	11.7	.447	4.95	.35	.68
28	60.1	7.6	54.0	13.7	.428	.72	.74	.63
29	61.3	7.0	55.7	12.6	.453	5.00	.60	.66
30	62.7	6.0	57.9	10.8	.488	.37	.32	.70
31	61.1	7.5	55.1	13.5	.444	4.90	.77	.64

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1874.*

Hourly Means, &c., of the Observations and of the Hygrometrical elements
dependent thereon.

Hour.	Mean Height of the Barometer at 32° F _{alt} .	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.010	30.093	29.900	0.193	63.5	68.5	58.4	10.1
1	.031	.082	.889	.193	62.8	68.0	57.2	10.8
2	.021	.070	.876	.194	62.2	67.5	56.4	11.1
3	.011	.060	.865	.195	61.5	67.0	56.2	10.8
4	.013	.052	.872	.180	60.9	66.4	56.0	10.4
5	.026	.063	.882	.181	60.3	65.8	55.5	10.3
6	.013	.081	.901	.183	59.7	65.0	54.0	11.0
7	.063	.105	.917	.188	59.5	64.6	53.9	10.7
8	.089	.131	.946	.185	61.5	65.6	55.0	10.6
9	.110	.154	.983	.171	65.4	70.5	58.5	12.0
10	.113	.157	.985	.172	69.1	74.2	62.2	12.0
11	.094	.144	.979	.165	72.0	75.6	65.4	10.2
Noon.	.060	.106	.946	.160	73.9	77.7	67.5	10.2
1	.027	.072	.924	.148	75.4	78.1	69.2	8.9
2	.003	.041	.912	.132	76.2	78.8	70.5	8.3
3	29.988	.030	.892	.138	76.2	79.3	71.0	8.3
4	.986	.023	.882	.141	75.0	78.0	70.0	8.0
5	.993	.033	.883	.150	73.4	76.0	68.5	7.5
6	30.006	.053	.885	.168	70.5	73.5	65.5	8.0
7	.022	.073	.905	.168	68.5	72.0	63.5	8.5
8	.039	.088	.926	.162	67.1	71.0	62.3	8.7
9	.050	.100	.931	.169	66.0	70.8	61.0	9.8
10	.057	.096	.931	.165	65.0	69.7	60.0	9.7
11	.050	.091	.928	.163	64.2	69.0	59.0	10.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb.
Thermometer Means are derived from the observations made at the several
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1874.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	59.6	3.9	56.1	7.4	.459	5.13	1.42	0.78
1	58.9	3.9	55.4	7.4	.449	.01	.40	.78
2	58.4	3.8	55.0	7.2	.442	4.95	.34	.79
3	57.9	3.6	54.7	6.8	.438	.90	.26	.80
4	57.4	3.5	54.2	6.7	.431	.82	.22	.80
5	56.9	3.4	53.8	6.5	.425	.76	.17	.80
6	56.4	3.3	53.4	6.3	.419	.71	.11	.81
7	56.3	3.2	53.4	6.1	.419	.71	.07	.82
8	57.5	4.0	53.9	7.6	.426	.77	.39	.77
9	59.3	6.1	54.4	11.0	.434	.80	2.15	.69
10	61.1	8.0	54.7	14.4	.438	.83	.95	.62
11	62.3	9.7	54.5	17.5	.435	.78	3.72	.56
Noon.	62.6	11.3	54.7	19.2	.438	.78	4.23	.53
1	63.1	12.3	54.5	20.9	.435	.73	.70	.50
2	63.4	12.8	54.4	21.8	.434	.70	.96	.49
3	63.3	12.9	54.3	21.9	.432	.69	.67	.49
4	62.7	12.3	54.1	20.9	.429	.68	.63	.50
5	63.4	10.0	55.4	18.0	.449	.90	3.97	.55
6	63.6	6.9	58.1	12.4	.491	5.40	2.73	.66
7	63.0	5.5	58.6	9.9	.499	.51	.14	.72
8	62.3	4.8	58.5	8.6	.498	.50	1.82	.75
9	61.5	4.5	57.9	8.1	.488	.40	.68	.76
10	60.6	4.4	57.1	7.9	.475	.27	.60	.77
11	60.1	4.1	56.4	7.8	.464	.16	.53	.77

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Mile.	
1	124.5	...	N by W, N E & N	...	70.5	B to 5 A.M., \i to 8 A.M. B to 11 P.M. Slightly foggy at 8 & 9 P.M.
2	123.5	...	N & W N W	...	26.6	B to 6 A.M. \i to 9 A.M. B to 11 P.M.
3	124.0	...	WNW & NNW	...	40.3	B.
4	128.0	...	N N W	...	56.0	B.
5	127.0	...	NNW & WNW	...	56.7	B.
6	125.0	...	W S W & N W	...	36.5	B. Foggy from midnight to 2 A.M. & 8 to 11 P.M.
7	130.5	...	N W & N	...	37.4	B to Noon, \i to 6 P.M. B to 11 P.M. Foggy from Midnight to 3 A.M. & 6 to 11 P.M.
8	125.0	...	N by W & N by E	...	40.2	B to 6 A.M., \i to 6 P.M. B to 11 P.M. Slightly foggy from Midnight to 6 A.M.
9	123.5	...	N by E	...	39.9	B to 3 A.M., \i to 10 A.M., \i to 1 P.M., \i to 4 P.M., \i to 6 P.M. B to 11 P.M. Slightly foggy from 1 to 3 A.M. & 7 to 11 P.M.
10	127.0	...	N by E	...	59.0	B to 1 A.M., \i to 6 A.M., \i to 6 P.M. B to 11 P.M. Slightly foggy at Midnight & 1 A.M.
11	120.5	...	N by E & N	0.2	126.3	B to 4 A.M. S to 7 A.M., \i to Noon B to 11 P.M. Foggy from 8 to 11 P.M.
12	126.4	...	N & N by W	...	104.5	B to 7 A.M., \i to 4 P.M. B to 11 P.M. Slightly foggy at 7 & 8 P.M.
13	125.0	...	N & N by E	...	129.2	B to 4 A.M., \i to 11 A.M. B to 2 P.M., \i to 6 P.M. B to 11 P.M.
14	125.0	...	N by W & N by E	...	190.2	B to 5 A.M., \i & \i to 10 A.M. B to 11 P.M.
15	125.8	...	N by E & N	...	179.5	B to 5 A.M., \i to 11 to A.M. B to 11 P.M.
16	116.0	...	NNE & WNW	...	146.5	B. Slightly foggy at 5 & 6 A.M.
17	121.0	...	N W & N by W	...	133.3	Chiefly B.

\iCirri, —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,
\i Cirro, cumuli-B clear, S straton, O overcast, T thunder, L lightning,
R. rain, D, drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
the in month of December 1874.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Mies.	
18	127.5	...	N by W	...	139.8	B to 1 P. M., \i to 11 P. M.
19	127.8	...	N by W & N	...	121.5	\i to 2 A. M. B to 2 P. M., \i & \i to 11 P. M. Slightly foggy from 8 to 10 P. M.
20	124.0	...	N by E, N & NNW	...	145.5	\i. Slightly foggy at 8 & 9 P. M.
21	123.2	...	N by W, NNW & N [W	...	138.7	B to 5 A. M., \i to 7 A. M. B to 2 P. M., \i to 6 P. M. B to 11 P. M. Slightly foggy at 8 & 9 P. M.
22	123.0	...	N W & N N W	...	72.9	B. Foggy from 7 to 11 P. M.
23	131.5	...	N W	...	76.2	B to 5 A. M., \i to 8 A. M. B to Noon, \i to 6 P. M. B to 11 P. M. Foggy from Midnight to 5 A. M., & 8 to 11 P. M.
24	120.0	...	W N W [S W	...	76.6	B. Foggy at Midnight & 1 A. M. & from 7 to 11 P. M.
25	133.0	...	WNW, WSW &	...	64.1	B to 2 A. M., \i to 7 A. M., \i to 10 A. M. B to 3 P. M., \i to 5 P. M. B to 11 P. M. Foggy from Midnight to 7 A. M.
26	132.5	...	S W & W N W	...	86.0	B to 9 P. M., \i to 11 P. M. Slightly foggy from 7 to 9 P. M.
27	125.0	...	N by E & N	...	151.1	\i to 1 A. M. B to 9 A. M., \i to Noon B to 7 P. M. \i to 11 P. M.
28	126.3	...	N & N N W [N	...	92.4	\i to 7 A. M. B to 11 A. M., \i to 5 P. M. B to 11 P. M. Slightly foggy at 9 & 10 P. M.
29	130.0	...	WSW, SW & W by	...	63.4	\i to 2 A. M. B to Noon \i to 3 P. M. B to 11 P. M. Slightly foggy from 7 to 9 P. M.
30	134.0	...	W by S & W S W	...	59.0	B. Slightly foggy from 6 to 9 A. M. & 8 to 11 P. M.
31	132.0	...	W by N & N W	...	76.8	B.

\i Cirri, —i Strati, ~i Cumuli, \i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,
\i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning
R. rain, D. drizzle.

*Abstract of the Results of the Hourly Meteorological Observations
taken at the Surveyor General's Office, Calcutta,
in the month of December 1874.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month	80.039
Max. height of the Barometer occurred at 10 A. M. on the 31st ...	30.157
Min. height of the Barometer occurred at 3 A. M. on the 26th ...	29.865
Extreme range of the Barometer during the month	0.292
Mean of the daily Max. Pressures	30.115
Ditto ditto Min. ditto	29.983
Mean daily range of the Barometer during the month	0.132

	°
Mean Dry Bulb Thermometer for the month	67.1
Max. Temperature occurred at 3 P. M. on the 30th	79.3
Min. Temperature occurred at 7 A. M. on the 21st	53.9
Extreme range of the Temperature during the month	25.4
Mean of the daily Max. Temperature	76.4
Ditto ditto Min. ditto,	59.4
Mean daily range of the Temperature during the month	17.0

Mean Wet Bulb Thermometer for the month	60.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.6
Computed Mean Dew-point for the month	55.2
Mean Dry Bulb Thermometer above computed mean Dew-point ...	11.9

	Inches.
Mean Elastic force of Vapour for the month	0.445

	Troy grain.
Mean Weight of Vapour for the month	4.93
Additional Weight of Vapour required for complete saturation ...	2.39
Mean degree of humidity for the month, complete saturation being unity	0.67

	°
Mean Max. Solar radiation Thermometer for the month	126.0

	Inches.
It rained no days.—Max. fall of rain during 24 hours	Nil.
Total amount of rain during the month	Nil.
Total amount of rain indicated by the Gauge* attached to the anemometer during the month	Nil.
Prevailing direction of the Wind ... N., N. W. & N. by E.	

Height 70 feet 10 inches above ground.

Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Dec. 1874.

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MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N. Rain on.	N. by E. Rain on.	N. N. E. Rain on.	N. E. Rain on.	E. N. E. Rain on.	E. by N. Rain on.	E. Rain on.	E. by S. Rain on.	E. S. E. Rain on.	S. E. Rain on.	S. Rain on.	S. by W. Rain on.	S. S. W. Rain on.	S. W. Rain on.	W. S. W. Rain on.	W. by S. Rain on.	W. Rain on.	W. by N. Rain on.	W. N. W. Rain on.	N. W. Rain on.	N. N. W. Rain on.	N. by W. Rain on.	Rain on.
Midnight	6	5												12	1	1			4	4	12	6	
1	6	5	1											12	1	1			5	3	12	5	
2	6	5	1											12	1	1			4	4	12	5	
3	5	5	1											12	1	1			3	3	12	5	
4	5	5	1											12	1	1			4	4	12	5	
5	5	5	1											12	1	1			3	3	12	5	
6	5	5	1	1										12	1	1	1	1	3	3	12	5	
7	5	5	1	1										12	1	1			4	4	12	5	
8	6	5	1	1										12	1	1			3	3	12	5	
9	5	5	3		1									12	1	1			5	5	12	3	
10	2	3	4		12									12	12	12			6	5	12	3	
11	3	4	4	1	12									12	12	1			1	5	7	3	
Noon.	5	12	3	3										12	1	1			3	7		4	
1	4	6	3	2										1	1	1	1		3	4	3	12	
2	4	3												1	1	1			2	5	3	5	
3	6	4	12	1							1				1	1			3	4	3	5	
4	9	3		1											12			1	5	3	3	4	
5	6	5													12			1	5	3	3	4	
6	6	5													12			1	5	5	4	3	
7	6	5													12			1	5	5	4	3	
8	6	5												1	1	1		1	5	5	4	3	
9	6	5												1	1	1	1		5	5	3	3	
10	6	6												1	1	1			5	5	4	3	
11	6	6												1	1	1			4	5	4	3	

Meteorological Observations.

